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MARKETING POULTRY AND EGGS

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MARKETING POULTRY AND EGGS

By George B. Rogers and Frank M. Conley
Agricultural Economists

INTRODUCTION

Everyone in the poultry industry may be proud of the record this industry has made in reducing costs and in pioneering in structural innovations. The poultry industry is one of the most dynamic in the agricultural sector. But these achievements have not been accomplished without problems, for growth, change, and progress create problems. The current problems of the poultry industry result mainly from internal stresses resulting from rapid change.

In this chapter, we shall first describe the major commodity segments of the industry. Second, we shall enumerate some of the major changes which have taken place in evolving the present industry. Third, we shall discuss some of the problems faced by the industry.

A simple definition of the job of marketing poultry, starting from production, would be "the expiditious movement of poultry products from producers to consumers." Marketing can be examined from several approaches.

One approach is geographic. Areas of heavy production of poultry and eggs are frequently at some distance from areas of heavy concentrations of population. Thus, substantial volumes of products must be assembled, processed, transported long distances, and distributed.

Another approach is functional. Various sets of functions can be enumerated. A typical list might consist of buying, selling, transporting, storing, financing, risk-bearing, standardization, and supplying market information (24, p. 18). 1/

Still another approach is in terms of the types of firms, or institutions, that perform various tasks. A list of typical operating institutions in the poultry and egg industries would include assemblers, processors and packers, shippers, truckers, receivers, distributors, storage houses, retailers, restaurants, exporters, importers, brokers, and various local, State, and Federal regulatory agencies. Other institutions, public and private, provide various supporting services.

In quantifying the marketing job, one can trace the volumes of product that move through alternative marketing channels. One can also attach costs, or price spreads to these channels. In the absence of complete and continuous information on aggregate costs, it may be necessary to use a simplified institutional approach, as is done by the U.S. Department of Agriculture in preparing its regular price and margin series on poultry and eggs. Thus, we derive the farm-to-receiver price spread, the receiver-to-retailer price spread, and the retail store price spread, the spread between what the retailer pays and what he charges the consumer.

Another way of dividing farm-to-retail price spreads is to derive values for resources used in the marketing process. Resources may be grouped as labor, containers and supplies, machinery, buildings, transportation vehicles, and management.

1/ Underscored numbers in parentheses refer to Selected References, p. 366.

A shopper selecting eggs looks for USDA grade mark on carton.

Several decades ago, one could have easily delineated two systems being used to market poultry products--long-distance and local. In the long-distance system, many small farmers sold to many small decentralized assemblers, who shipped to many small receivers and jobbers, who, in turn supplied many small retail outlets through which poultry products reached consumers. In the local system, products reached the consumer more directly, through consumer contact with the producer, huckster, or processor. The more important distinction now is between supplying large volumes to mass-merchandising outlets and supplying smaller volumes to outlets for differentiated or specialty products. Because the mass-merchandising system contains most of the remnants of both the long-distance and local systems, and dwarfs the specialty system, subsequent discussions will be oriented toward the mass-merchandising system. Only commercial production of poultry and eggs is included in this discussion. Products consumed on the farm are excluded.

EGGS

Production of chicken eggs is still the most important poultry enterprise, despite the recent rapid growth and increasing importance of broiler and turkey production. Eggs of other species of poultry are used almost entirely for hatching purposes. Chicken eggs account for 53 percent of farm income from poultry products; broilers, 31 percent; turkeys, 11 percent; and farm chickens and other poultry, 5 percent.

Most of the chicken eggs produced are marketed as shell eggs--approximately 80-85 percent. Of the rest, 10-15 percent are marketed as frozen or dried products, and 6 percent are used for hatching.

Marketing Channels

As eggs move through marketing channels, various marketing functions may be performed by several different kinds of firms. In the simplest channel, eggs move directly from producer to consumer. In the most complex, eggs move from producers to country buying stations to country assemblers to city wholesale distributors to retail stores and finally to consumers. The predominant process is one in which eggs are assembled from producers by assembler-shippers who ship in truckload lots (600 or more 30-dozen cases) to wholesale distributors. These firms sell to a variety of outlets, but the most important are food chains and independent retailers. Recently, there has been a tendency for large-volume producer-distributors to replace the assembler-shippers. An important variation is for the large-volume producer-distributor or assembler-shipper to serve individual retail stores directly.

Shifts in the location of grading and cartoning are of prime importance in explaining changes in egg-marketing channels. These operations were at first performed primarily by wholesalers in the central market. As the volume of eggs handled by food chains increased, the chains began performing these operations in their city warehouses. This resulted in their being able to (1) bypass the wholesalers and jobbers, and (2) maintain closer control over the kind and quality of eggs being offered to their customers. Later, as a result of many improvements in production and marketing processes, assembler-shippers, large-volume producer-shippers, and producer-distributors demonstrated that they could do grading and cartoning satisfactorily. Furthermore, they were able to do so at country points at lower costs than the city candling rooms of food chains (6). Thus, in recent years a tendency for decentralization of grading and cartoning operations toward country points has occurred.

Figure 1 shows the relative importance of various marketing channels for eggs. Data do not show the loss in marketing channels due to breakage and spoilage. This has been estimated as about 3 percent.

The 12 leading egg-producing States are California, Iowa, Pennsylvania, Georgia, Minnesota, Texas, Ohio, North Carolina, Indiana, Illinois, Alabama, and Arkansas. The principal deficit areas are Southern New England, the Middle Atlantic States, Delaware, Maryland, Virginia, West Virginia, Kentucky, Tennessee, Ohio, Michigan, Illinois, most of the Mountain States, the West South Central area, and Florida (fig. 2). Thus, the principal movements of eggs are east and west from the North Central States; northeast, west, and south to Florida from the Southeast; and north up the Pacific Coast; and east to the Mountain, and Southwest, and South Central States from California.

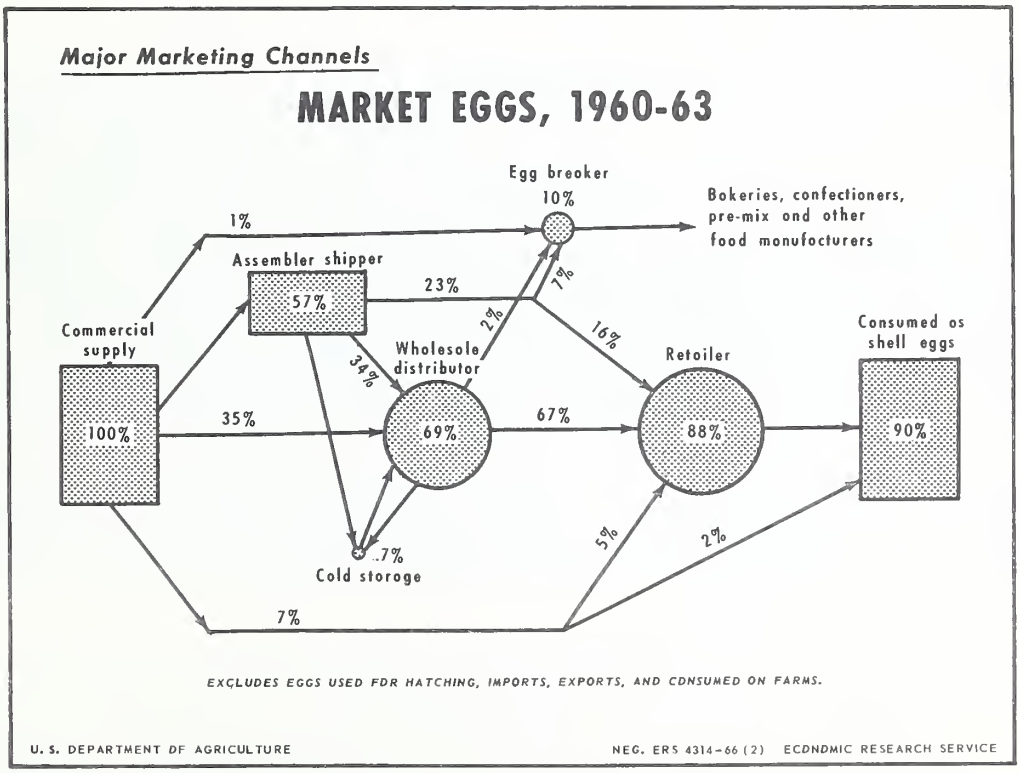


Figure 1

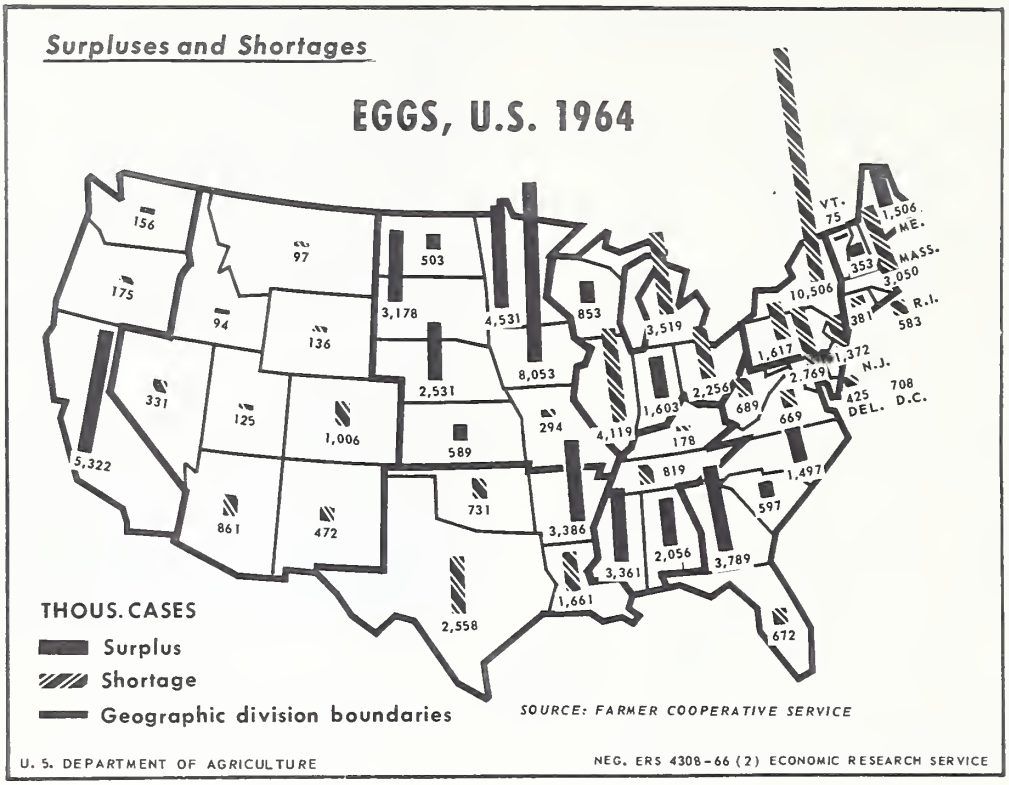


Figure 2

Farm-Retail Spread

In figure 3, the farm-to-retail price spread for large Grade A eggs in the United States is shown by marketing agencies, functions, and cost items.

The division by marketing agencies shows that about one-fifth of the total farm-to-retail price spread which approximated 24 cents per dozen in recent years, is accounted for by the farm-to-receiver price spread. Agencies in the farm-to-receiver group are assemblers, haulers, and country grading and cartoning plants. Two-fifths is accounted for by the receiver-to-retailer price spread. Here the principal agencies involved are receivers, distributors, storage houses, and city candling and cartoning plants. The remaining two-fifths of the price spread is the retail store margin.

When the farm-to-retail price spread is divided by functions, retailing accounts for the largest share--about 40 percent. Wholesaling and storage account for 19 percent, grading and packing for 23 percent, transportation for 13 percent, and assembly for 5 percent.

Adequate data are not available to accurately break down the retail store spread into cost components. However, wages and salaries probably account for the major share of the retail store spread. Wages and salaries account for 40 percent of the farm-to-retailer price spread; supplies, 17 percent; procurement, 9 percent; distribution, 17 percent; overhead, 7 percent; and miscellaneous items, 10 percent. Profit is not shown separately, but is included in each of the categories.

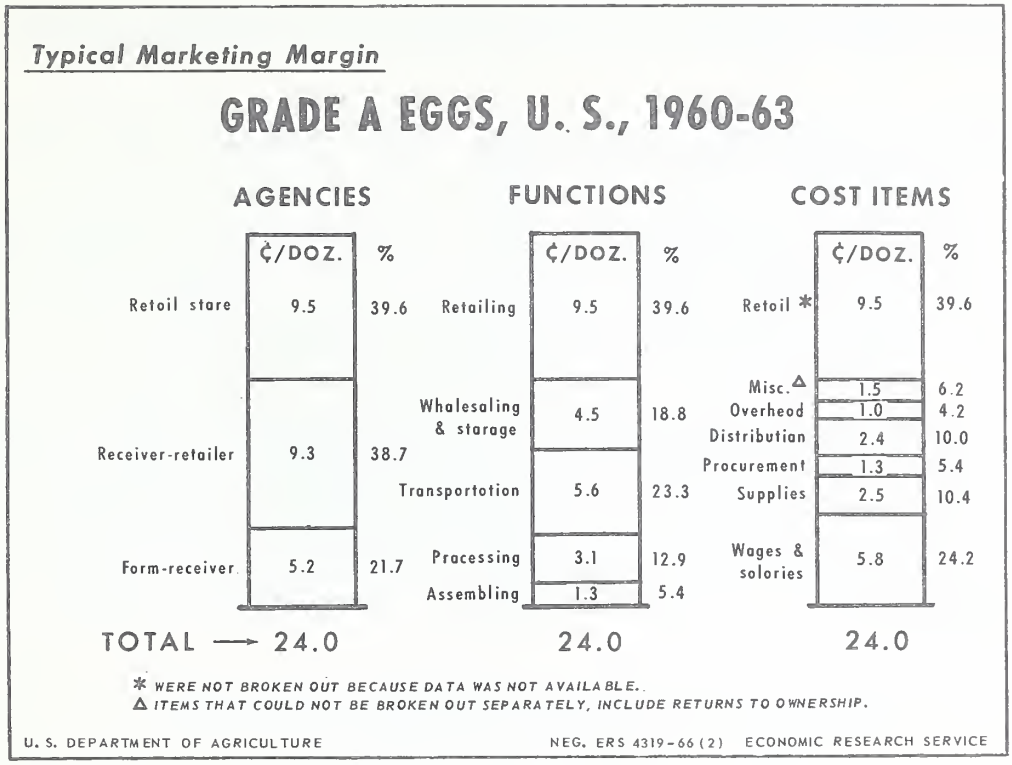


Figure 3

Farm-to-receiver, receiver-to-retailer, and retail store price spreads in 12 cities are regularly determined by the Department of Agriculture for both large and medium eggs of Grade A or better quality.

Cities receiving most of their eggs from nearby producing areas generally have relatively direct systems of marketing to retail stores, and tend to have narrower farm-to-retailer price spreads than cities receiving a large proportion of their eggs from distant producing areas. In the more complex marketing systems of the cities further from producing areas, two or more wholesale firms are usually involved in the assembly and distribution of eggs from farms to retail stores. For example, for eggs marketed in New York market, farm-to-retailer price spreads are narrower for eggs received from nearby producing areas than for eggs received from the Midwest. Similarly, farm-to-retailer price spreads in Atlanta,, St. Louis, San Francisco, and Los Angeles, which have substantial supplies of eggs nearby, are lower than in Washington, Baltimore, Seattle, and Denver, which have smaller nearby supplies. However, despite the large volume of eggs produced in the Midwest, farm-to-retailer price spreads in Chicago and Cleveland are relatively wide, probably because the marketing systems serving these cities remain relatively complex.

Marketing Costs

Several recent studies have investigated the potential economies of scale in egg-packing plants (3, 17, 20). All of these studies found that economies of scale existed throughout the range of model plant sizes studied. For example, in a study of 7 model plants (17) ranging in capacity from 7 to 120 cases per operating hour, it was

estimated that indicated costs at 100 percent of capacity ranged from $1.93 per case of 30 dozen eggs in the smallest plant to $1.45 per case in the largest.

While technical efficiencies are equally available to firms in all areas, the actual costs per unit of output may vary because of differences in factor prices. Moreover, the optimum size of unit under given conditions is determined by both assembly and plant costs. The higher the density of production, the lower the assembly costs and the larger the optimum plant size. Thus, areas of concentrated production are likely to have lower combined assembly and packing costs. These items, plus transportation to consuming centers, account for an important share of egg-marketing costs. Their differences, together with varying degrees of complexity of marketing channels, help explain divergent farm-to-retailer price spreads.

Table 1 gives a breakdown for average U.S. costs of assembling, candling, and cartoning eggs and transporting them from packing plants to outlets. The grading and packing of eggs accounts for 57 percent of the total cost with assembly and transportation costs making up the remaining percentage. These are average costs for eggs of all grades and sizes. About 60 percent of the total volume graded at plants are Grade A large, extra large, and above; 25 percent are Grade A medium or better; and about 5 percent each are Grade A pullets (small and better), Grade B, and unclassified.

Seasonality of Production, Consumption, and Prices

While egg production varies much less seasonally than a decade ago, seasonal variation still remains. Monthly egg production ranges from about 13.5 million cases in September to almost 16 million cases per month from March to May.

Exports and imports of shell eggs and egg products are of minor importance on an annual basis. There is a net movement of shell eggs into storage from April to June and a net out-movement in other months. However, exports, imports, and storage movements have only a minor effect on supplies of eggs available monthly for shell egg use.

Per capita consumption of shell eggs is greatest in March and April, which are months of heaviest production and usually include the Easter period. Consumption remains relatively constant from May through September, rising again in October and November. Use in December is slightly higher than in November, January, and February (fig. 4).

The two major uses of eggs, other than consumption as table eggs, are for breaking for use in egg products and hatching. Requirements for breaking and hatching vary seasonally, hatching requirements being greatest in the February-May period, and breaking use being greatest in April-June.

Annual per capita consumption of shell eggs averaged 284 for 1963-65. Annual per capita consumption of egg products averaged 29 eggs over the same years.

Monthly retail and farm prices of eggs tend to follow the same seasonal pattern, rising from their lowest levels in the spring to higher levels in late summer, fall, and winter. Farm-to-retail price spreads are usually widest from late summer through January (fig. 5).

Table 1.--Average costs per dozen of assembling, candling, and cartoning eggs, and transporting them from packing plants to outlets, United States, 1963 1/

Items	Cost	Percentage of total
	Cents	Percent
Assembly	1.3	13.3
Packing:		
Plant wages	1.8	18.4
Supplies	1.9	19.4
General and Management	0.6	6.1
Selling	0.7	7.1
Overhead	0.6	6.1
Total packing	5.6	57.1
Transportation	2.9	29.6
Total cost	9.8	100.0

1/ Costs include both cartoned and loose-packed eggs.

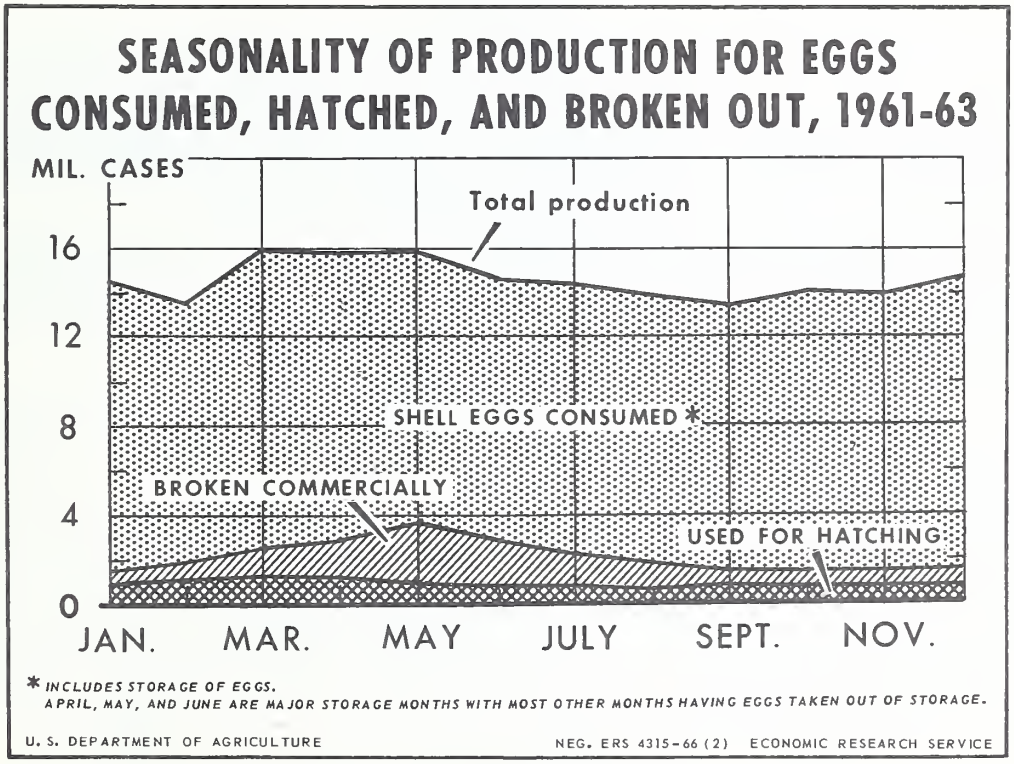


Figure 4

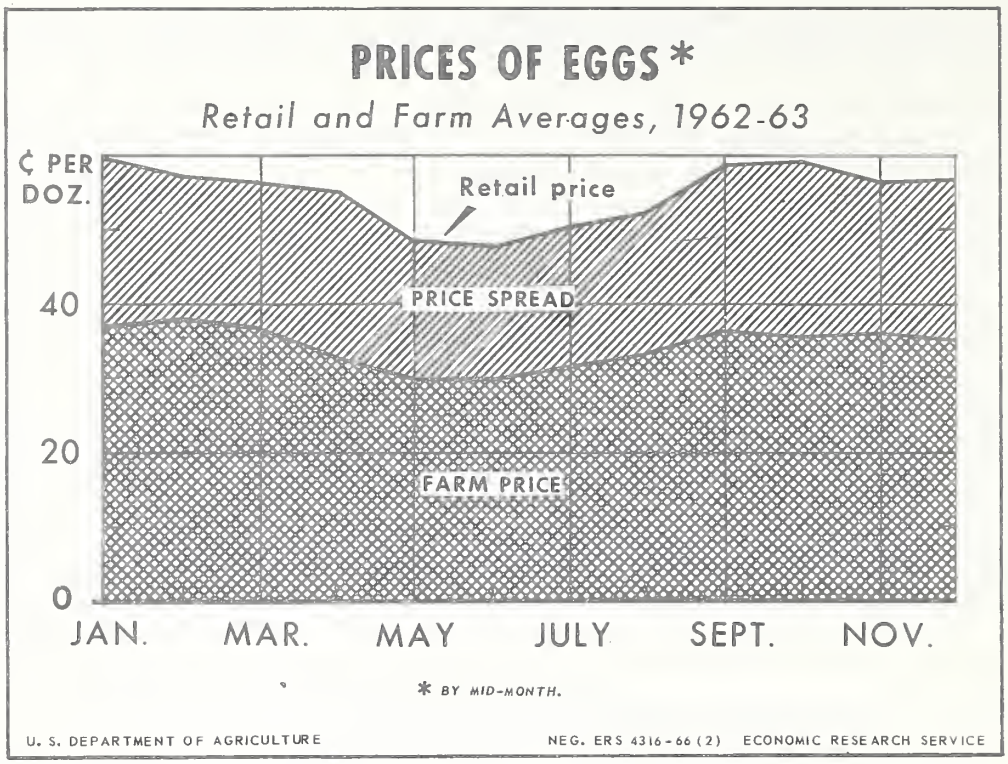


Figure 5

EGG PRODUCTS

The commercial egg products industry in the United States was founded prior to 1900. Numerous technical problems had to be solved, however, before rapid growth finally occurred in the 1920's and 1930's. During this period, imports of frozen and dried eggs from China were competing with domestic production.

Tremendous expansion in egg products production took place during World War II because of military and overseas feeding requirements. In 1944, a record 1.5 billion pounds of eggs were processed. About 74 percent of this volume was dried. After 1945, liquid egg production regressed sharply.

Total civilian use of egg products has increased since 1947. The expansion has been slow, however, and only in recent years has there been an increase in per capita consumption.

Breaking plants have had some difficulties in providing the precise quality required by end users, particularly with respect to the color of yolks. This has led to procurement difficulties, use of additives, and some consideration of contract production. Persistent difficulties with Salmonella organisms in egg products, and recent technological advances making pasteurization more feasible, have caused the Department of Agriculture to require pasteurization in their inspected plants and the Food and Drug Administration to propose amending standards of identity to require compulsory pasteurization of egg products moving in interstate commerce.

The Midwest is still the major egg breaking and drying area. There is a basic difference between commercial breaking operations in the Midwest and in other

regions. In the Midwest, the majority of plants are not connected with shell egg operations and are therefore competing buyers. This is a situation of long standing, which continues to be disrupting to firms that wish to develop year-round outlets for quality eggs. To get supplies during the heavy breaking season, egg breakers frequently bid producers away from shell egg plants, thereby upsetting quality programs.

While there are breaking operations in the South, the newer breakers have tended to appear only as a surplus has developed. This tends to be a support for shell egg prices rather than a seasonally disruptive force.

The largest user of egg products is the baking industry, with the premix and confectionery industries second and third. The form of the product used varies among the industries. Eighty percent of the volume used by the baking industry in 1960 was in the frozen form. The premix industry used dried egg products almost exclusively. Confectioners used over 60 percent in liquid form (table 2).

Based on prices paid for breaking stock at Midwestern plants, it appears that prices increase and spreads between prices paid by plants for shell eggs and the prices at which frozen eggs sell at wholesale become wider as distance from the Midwest increases. Thus, spreads at New York and Philadelphia are wider than those at Chicago and spreads at San Francisco are still wider. The differences are due mainly to difference in transportation costs. Level of sale and volume of sale also influence price spreads. Thus, price spreads determined by using prices of frozen eggs sold to bakers, hotels, and restaurants at Pittsburgh are wider than those based on wholesale selling prices at New York and Philadelphia (table 3).

BROILERS

The annual per capita consumption of broilers has been climbing since World War II and reached an average of 27.8 pounds for 1963-65.

Table 2.--Percentage of major forms of eggs used by food manufacturing industries, United States, 1960

Industry	Major forms of eggs used 1/				
	Frozen	Dried	Liquid	Shell	All
	Percent	Percent	Percent	Percent	Percent
Baking	80	13	5	2	100
Premix	2/	100	0	0	100
Confectionery 3/	27	4	63	6	100
Other 4/	60	3	3	34	100
Total used for industries	70	15	7	8	100

1/ Based on actual weight.
2/ Less than 0.5 percent.
3/ Mostly albumen.
4/ Includes firms making baby food, meat and fish products, noodles, macaroni, ravioli, mayonnaise, and a variety of specialty foods.

Source: (11)

Table 3.--Price spreads per pound between cost of raw eggs at Midwestern breaking plants and frozen egg products sold in selected markets, 1964 1/

Market	Whole egg	Blend	Whites	Plain yolk	Sugared yolk	Salted yolk
	Cents	Cents	Cents	Cents	Cents	Cents
Price spreads between raw egg cost at Midwestern breaking plants and--						
Wholesale selling prices of frozen eggs, Chicago...	5.20	---	7.80	---	3.85	3.39
Wholesale selling prices of frozen eggs, New York and Philadelphia.....	7.80	13.18	7.83	16.08	6.50	4.74
Prices for frozen eggs delivered to bakers, hotels, and restaurants, Pittsburgh.....	10.23	---	11.76	---	11.39	---
Wholesale selling prices for frozen eggs, San Francisco.....	11.33	16.66	10.40	---	12.60	11.67

1/ Estimated raw egg cost per pound at Midwestern breaking plants:

Whole eggs.....19.62 cents
Whites..... 7.70 cents
Yolks.....35.46 cents

2/ Prices for unclassified, undergrades, and checks estimated at $7.75 per case with yield of 39.5 pounds of liquid egg per 30-dozen case of shell eggs. Prices in Chicago for similar eggs averaged $8.17, and at Southeastern plants, $7.20 per case.

Source: Based on prices reported by USDA Market News Service.

Commercial broiler production originated to supply live birds for a high-price out-of-season market in large cities. But by the late thirties, the live poultry trade was declining and new areas to the south and west were emerging as major competitors to the Delmarva Peninsula and other northeastern areas. During World War II, the live trade lost further ground because of transportation and other marketing costs. Broiler production continued to expand during the war, and ice-packed fresh-killed broilers achieved an established market position. The ready-to-cook form, favored by wartime price ceilings and transportation economies, began to replace the New York dressed form (blood, feathers, and feet removed).

Broilers are now marketed chiefly as fresh ready-to-cook whole or cut-up birds. About 90 percent of the broilers are the equivalent of Grade A. Undergrades can be cut-up or further processed.

During the past few years, there has been some interest in packing completely frozen or surface-frozen broilers to save on transportation, facilitate easier handling at processing plants and in stores, and increase storability and shelf life. However, only about 11 percent of the volume of broilers packed under Federal inspection leaves plants in frozen form. Sales from plants in cut-up versus whole-carcass form have been increasing. In 1965, about 19 percent of the volume of broilers slaughtered under Federal inspection was cut up at processing plants. At least that much more was probably cut up by subsequent handlers, including retailers.

Marketing Channels

The growth in broiler output has been closely linked to mass-merchandising methods. One of the great efficiencies resulting from this relationship has been

shortened marketing channels. Thus, an increasingly greater volume of broilers has been going from processing plants directly to retailers. Old-line wholesale distributors and jobbers are being bypassed. In 1960-63, retailers received over 50 percent of their volume directly from processors (fig. 6).

Chainstores have a larger share of the volume of broilers sold than they do of the total volume of all food products. Of the volume of broilers consumed domestically as whole or cut-up birds, USDA estimates indicate that chainstores handle 68 percent, independent retail stores 20 percent, restaurants 7 percent, and institutions 5 percent.

The 10 leading broiler-producing States are Georgia, Arkansas, Alabama, North Carolina, Mississippi, Maryland, Texas, Delaware, Maine, and California. Only the first nine have a surplus of broiler meat over their needs. All other States are deficit. Hence, the principal flow of ready-to-cook broilers is from the South to the large metropolitan areas of the Northeast, the Midwest, and the Far West. Most of this volume comes from Georgia, North Carolina, Arkansas, Alabama, Mississippi, and Delmarva (fig. 7).

Farm-Retail Spread

In figure 8, the marketing margin for broilers has been divided into price spreads by agencies, function, and cost items. Among agencies, the farm-to-receiver spread accounted for less than 30 percent with the receiver-to-retail spread taking up about 20 percent of the total. The retail store margin was just over 50 percent of the total price spread.

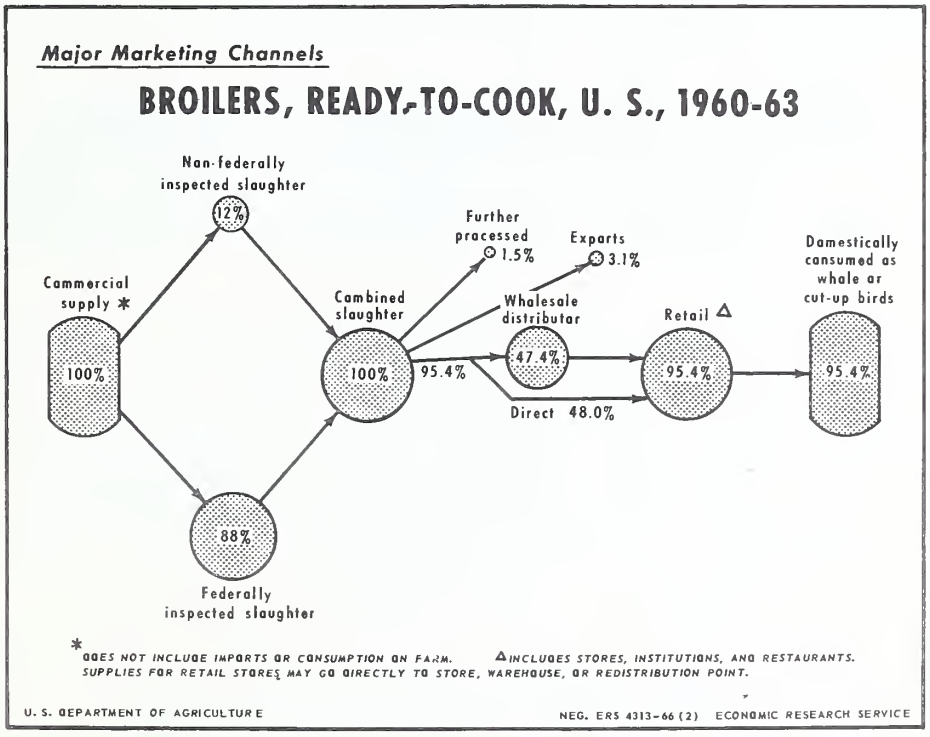


Figure 6

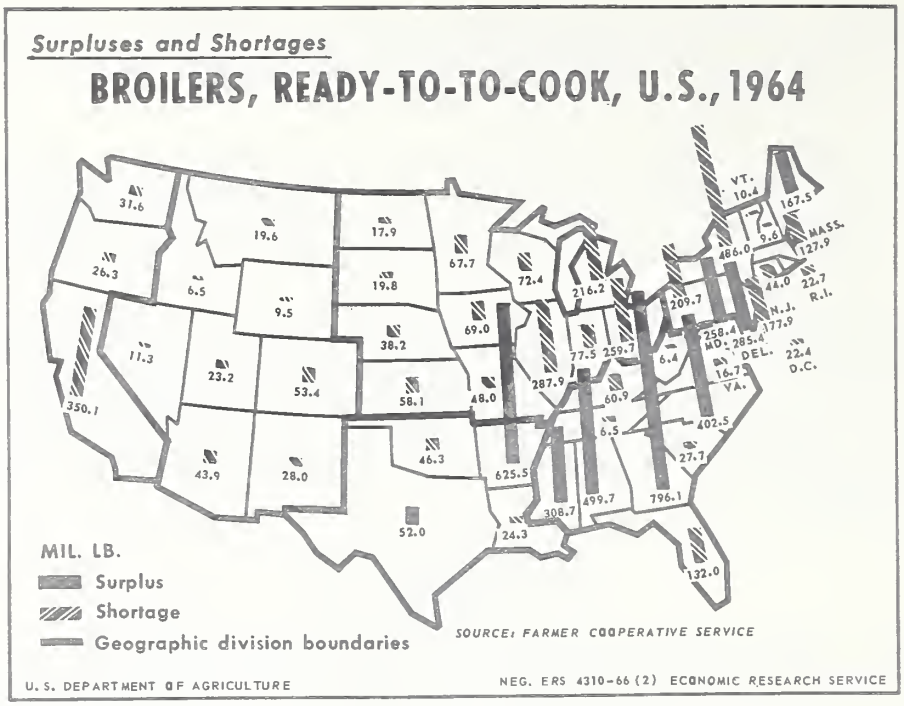


Figure 7

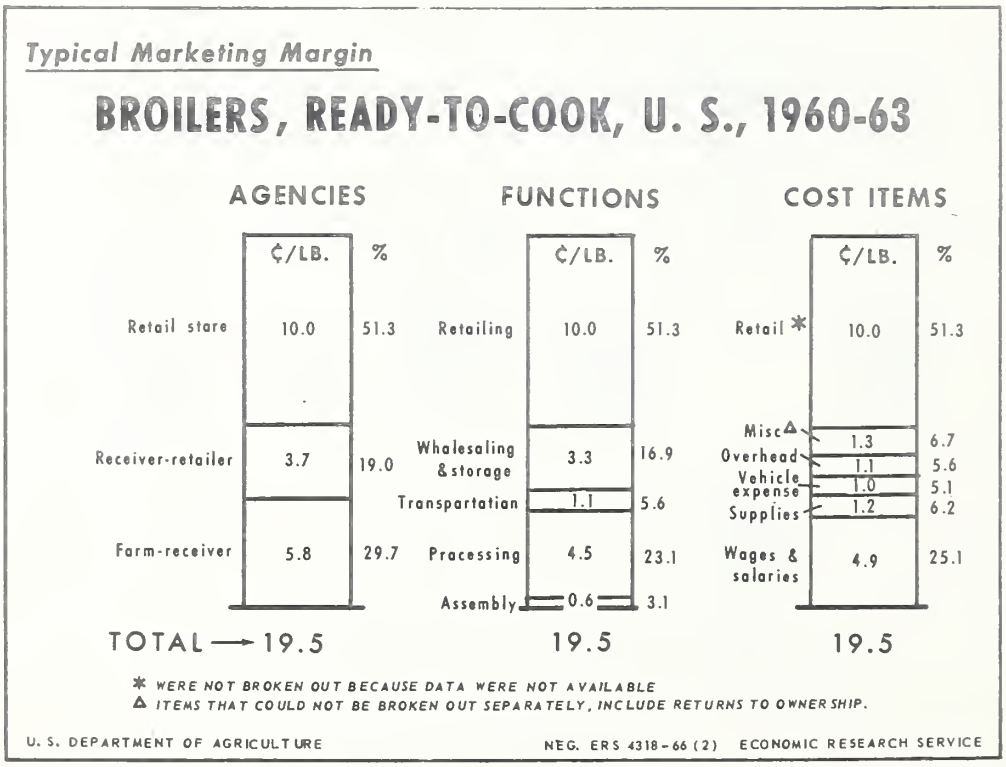


Figure 8

By function, over 50 percent of the farm-to-retail price spread was for retailing, 23.1 percent for processing, 16.9 percent for wholesaling and storage, 5.6 percent for transportation, and 3.1 percent for assembling the live birds.

Lack of information at the retail level made it impossible to break down the entire price spread by cost items. Hence, the price spread by cost items includes only assembly through wholesaling. Wages and salaries made up over 50 percent of the spread; supplies, 13 percent; vehicle expense, 10 percent; overhead, 11 percent; and miscellaneous cost, 14 percent. Profit was not shown separately but is included in each of the categories.

Prices to retailers for broilers generally reflect added costs of transporting and handling as distance from major surplus areas increases. While prices to retailers in New York, Baltimore, and Washington are higher than those in Atlanta, prices in Boston (because of averaging of prices in Maine and other areas) are slightly below. Prices on the West Coast are several cents higher than in markets in the East or Midwest.

Another reason that prices vary between cities is the varying extent of "specialing" in different cities. It is a common practice to use broilers as price specials along with other meats. Either retailers or suppliers may initiate action leading to specials. In one sense, specialing may disrupt orderly producing and marketing arrangements. In another sense, specialing may well increase total annual sales, since several times as many pounds are sold in "special" weeks as in "nonspecial" weeks.

Marketing Costs

Marketing costs vary with density of production within an area, size of processing plants, distance from markets, and factor prices.

Several recent studies have been made of costs of assembling and processing broilers. These indicate that economies of scale exist in broiler processing for plants capable of processing 10,000 or more birds per hour of operation. However, the optimum size of processing plant in a given situation will be determined mainly by the combined costs of assembling (which depends on production density) and processing.

One study (22) indicated that longrun average costs of broiler processing fall from 3.8 cents per pound (live weight basis) at an output of 4.15 million pounds per year to 2.6 cents per pound at an output of 69.16 million pounds per year. On the other hand, costs per pound for assembling live broilers tend to increase with total volume at any given level of density of production. According to a 1964 study of marketing New England poultry, with production density at 1,000 pounds per square mile per year, combined costs reached a minimum at about 25 million pounds per year; at density levels of 5,000 and 25,000 pounds per square mile per year, combined costs are at a minimum at 70 million pounds per year or more (16).

Utilization of plant capacity also affects costs. A given annual volume of broilers can be handled by one large slaughtering plant operated at less than 100 percent of capacity, or by two smaller plants operated at capacity. For example, a plant capable of slaughtering and eviscerating 3,600 broilers per hour, but operating at 50 percent of capacity, might process a given volume for 4.0 cents per pound live weight. A plant with a capacity of only 1,800 birds per hour, but operated at 100 percent of capacity, could process the same total volume for 3.3 cents per pound.

A breakdown of average costs of processing, transporting, and selling broilers to retail outlets shows that, in 1963, processing costs accounted for 52 percent of the total cost with transportation and selling cost at 48 percent (table 4). The largest items in processing plant were wages and supplies.

Seasonality of Slaughter, Consumption, and Prices

There is seasonal variation in broiler slaughter. Demand also varies seasonally. Domestic consumption is highest in May and June and lowest in December and January. The two major outlets other than domestic consumption of fresh broilers are further-processing of broilers and export of broilers. Seasonal variation for these seem to follow the seasonal variation in broiler slaughter.

The monthly patterns for farm and retail prices tend to be the opposite of the seasonal variations for slaughter. When slaughter is highest, the price per pound is lowest. The farm-to-retail price spreads are narrowest in December and January and widest in in early spring.

TURKEYS

The bulk of the turkeys marketed are sold from processing plants in frozen form. In 1965, over 86 percent of the volume of turkeys slaughtered under Federal inspection was frozen at processing plants. As with broilers, a rapid shift from the New York dressed form to the ready-to-cook form began during World War II. By 1960, output of New York dressed turkeys was negligible. In contrast to broilers, less than 5 percent of the volume of turkeys slaughtered under Federal inspection in 1964 was cut up at processing plants.

Marketing Channels

Turkeys are marketed in much the same way as broilers. Figure 9 shows the major flows of ready-to-cook turkeys. With the growth of large processors and large chains, channels have become more direct. Wholesale distributors are much less important than they were formerly. About 58 percent of the volume sold to domestic consumers in ready-to-cook form goes directly from processors to retail warehouses or stores.

Of the volume sold to domestic consumers in ready-to-cook form, chainstores handle 75 percent. Independent retail stores handle 14 percent; restaurants, 5 percent; and institutions, 6 percent.

The leading turkey-producing States are: California, Minnesota, Iowa, Missouri, Texas, Wisconsin, North Carolina, Ohio, Arkansas, and Indiana. The 10 major surplus States are: Minnesota, California, Iowa, Utah, Missouri, Wisconsin, Arkansas, Indiana, Colorado, and North Carolina. Most states in the East are deficit, and the dominant movement of turkeys is from west to east (fig. 10).

Farm-Retail Spread

Figure 11 shows the price spreads for medium weight turkeys by agencies, by functions, and by cost items. By agencies, the spread is as follows: farm to receiver 41 percent, receiver to retailer just under 14 percent, and the retail store margin just over 45 percent.

Table 4.--Average costs per pound live weight for slaughtering and eviscerating, transporting, and selling of broilers, medium capacity plants, United States, 1963

Item	Costs per pound	Percentage of total costs
	Cents	Percent
Processing:		
Plant wages	1.4	24.1
Supplies	.8	13.8
Management	.3	5.2
Utilities	.2	3.4
Capital ownership	.3	5.2
Total processing	3.0	51.7
Transporting and selling:		
Live hauling	.6	10.4
Transporting to market	.9	15.5
Selling cost	.2	3.4
Miscellaneous 1/	1.1	19.0
Total transporting and selling	2.8	48.3
Total cost	5.8	100.0

1/ Includes intracity transportation, profits, and storage.

Source: (15, 22).

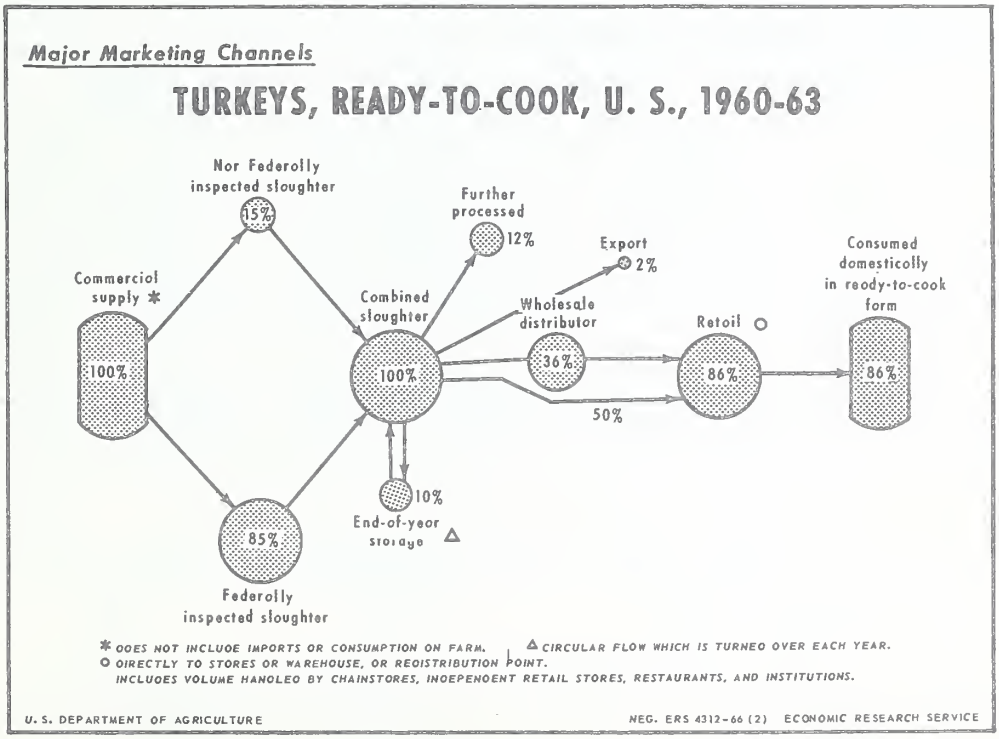


Figure 9

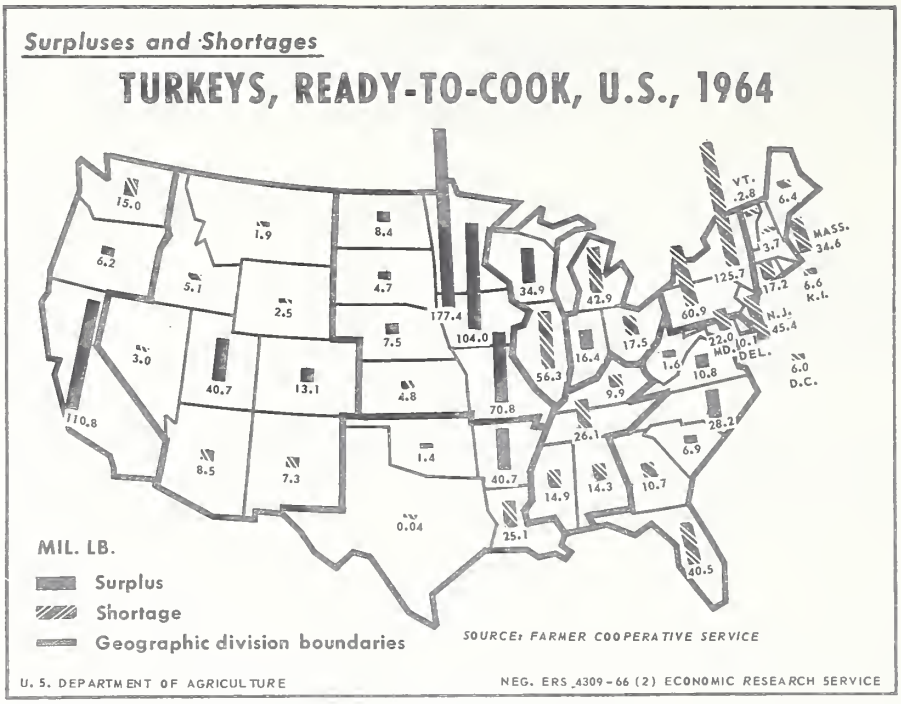


Figure 10

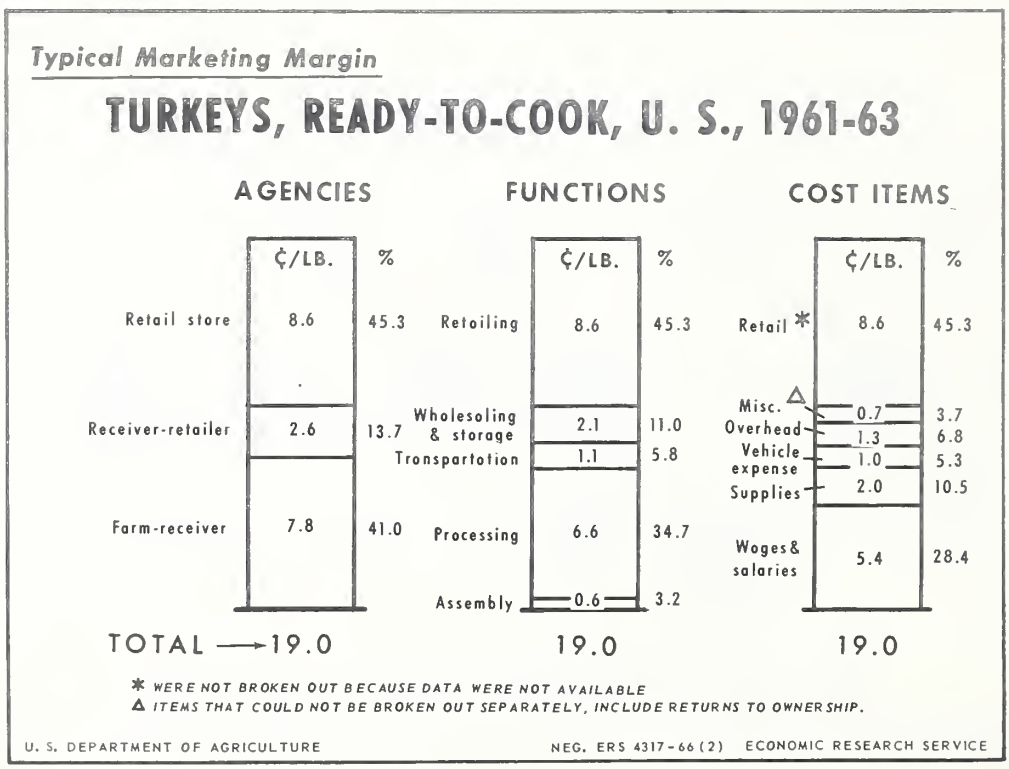


Figure 11

When price spreads are divided by functions retailing accounts for 45.3 percent and processing, 34.7 percent.

As with other major poultry products, information is lacking on costs at the retail level. Hence, the retail level was omitted from breakdown of the price spread by cost items. In the farm-to-retailer price spread, wages and salaries, 52 percent, and supplies, 19 percent, were the two largest cost items.

Marketing Costs

Marketing costs for turkeys are affected by the same forces influencing broiler marketing costs--plant operation, density of the production area, economies of scale in processing, distance from consuming centers, and factor prices. As with broiler plants, turkey processing plants have high fixed dollar costs but as plant size increases, per-unit costs fall. Economies of scale also exist for other cost items. The processing segment of the industry is experiencing the transition that earlier confronted the broiler industry, and economies of scale are causing decreases in numbers of plants, but increases in average size.

Production of turkeys is highly seasonal. Many processing plants, therefore, operate 6 or 7 months, or even less, during the year. In a recent study of turkey processing, it was found that costs were higher when the plants were operated at less than full annual capacity (24). For example, a plant with facilities to process 3,000 head of heavy young hens per hour had a total cost of 4.3 cents per pound when operated at full capacity for 243 days, but a cost of over 5 cents per pound when operated only 144 days per year.

Another point brought out was that, with a given yearly volume, costs per unit are usually higher when the plant is operated for a full year at less than 100-percent processing capacity than when the plant is operated at full capacity for fewer days per year.

Processing costs for turkeys vary by market classes. In 1960-61, they ranged from 5.8 cents for heavy hens and toms to 6.7 cents for fryer-roasters.. Breeder turkeys weigh about the same as heavy young hens and toms, but labor cost is higher since fewer breeder turkeys can be processed per hour because of the additional time spent removing penfeathers. Even though more fryer-roasters can be processed in an hour than heavy young turkeys, the total poundage processed per hour is considerably smaller. More packaging also is required for fryer-roasters (table 5).

The two major cost items for turkeys in all market classes are plant wages and supplies. As a proportion of the total processing cost, plant wages range from a low of 34.5 percent for heavy young hens and toms to a high of 40.3 percent for fryer-roasters. The cost for supplies runs about 30 percent of total per-unit costs for all market classes.

Costs for transportation, selling, and other functions amounted to about 3.8 cents per pound in 1961, distributed as follows:

	Cents per pound
Hauling	0.5
Transporting to market	1.1
Selling costs	.2
Miscellaneous (includes part of cost for longer term storage)	2.0

Table 5.--Average processing costs per pound in cents and percentages for major classes of ready-to-cook turkeys, United States, 1960-61

Item	Heavy young hens and toms		Breeders		Fryer-roasters	
	Costs per lb.	Percentage of total	Costs per lb.	Percentage of total	Costs per lb.	Percentage of total
	Cents	Percent	Cents	Percent	Cents	Percent
Processing costs:						
Plant wages	2.0	34.5	2.4	38.7	2.7	40.3
Supplies	1.9	32.7	1.9	30.7	2.2	32.8
Management	0.3	5.2	0.3	4.8	0.3	4.5
Utilities 1/	0.8	13.8	0.8	12.9	0.7	10.5
Capital ownership	0.8	13.8	0.8	12.9	0.8	11.9
Total	5.8	100.0	6.2	100.0	6.7	100.0
	Pounds		Pounds		Pounds	
Average weight per head	15.37		15.08		6.76	

1/ Includes ice if purchased and outside freezing and short-time storage facilities where used.

Source: (24).

Total costs for assembling, processing, selling, transporting, and storing ranged from 9.6 cents per pound for heavy young hens and toms to 10.5 cents a pound for fryer-roasters.

Seasonality of Slaughter and Consumption

Commercial slaughter of turkeys is highly seasonal. Processing of turkeys is lowest in February and continues to be relatively low into April. Beginning in late April and continuing into July, breeders are slaughtered in some volume. Slaughter of heavy young turkeys picks up in May and June, and increases rapidly in July, August, and September. Peak slaughter of heavy young turkeys occurs from late September to Christmas. Fryer-roaster slaughter is more uniform throughout the year, though volume increases somewhat during the peak season for heavy young turkeys.

For the most part, turkeys are consumed domestically. Per capita consumption of turkey meat in the United States was 7.1 pounds in 1963-65, compared with 5.4 pounds in 1955-57.

Turkeys are now consumed to a greater extent throughout the year than in the past. This has occurred because turkey prices are more favorable in relation to those of other meats, and because of the development of satisfactory fryer-roaster strains and breeds. Nevertheless, consumption is still highly seasonal and large volumes are stored in frozen form during peak slaughtering months for later use (fig. 12).

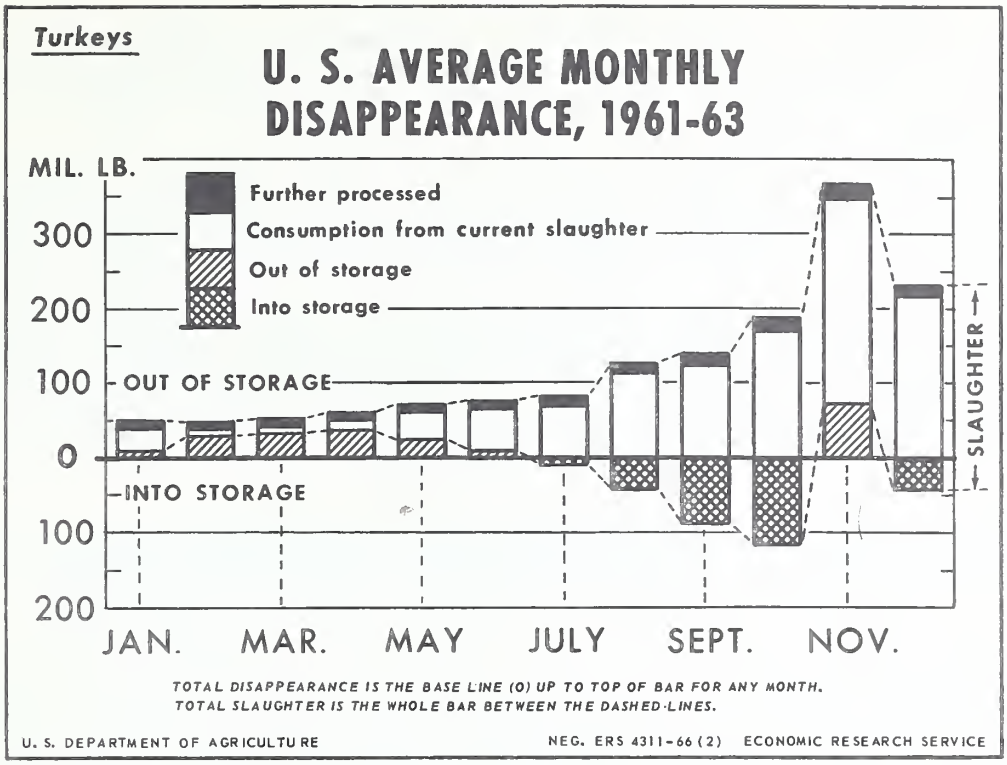


Figure 12

Movement of turkeys out of storage occurs in the first 5 months of the year when slaughter volume is small, and in November when total disappearance is high. Coldstorage holdings reach an annual low in June and July just before the start of the heavy processing season. The annual high in turkey storage comes in October just before the holiday season. It is estimated that the usual coldstorage carryover into January could supply consumer demand for at least 4 months of the following year.

FOWL AND OTHER POULTRY

Other than chicken broilers and turkeys, the next most important component of the poultry meat supply consists of fowl (or hens). These are a byproduct of the market egg industry when flocks are liquidated at the end of a laying period. Some cull pullets, old roosters, and capons are also sold by general farms or small specialized enterprises.

Before broiler and turkey production reached present proportions, fowl and other farm chickens were the principal component in the supply of poultry meat. In 1947, when combined per capita consumption of poultry meat was 22 pounds per person, farm chickens made up almost 14 pounds of the total and broilers and turkeys about 4 pounds each. By 1965, when total per capita consumption was 40.8 pounds, farm chickens made up 4.0 pounds, broilers 29.4 pounds, and turkey, 7.4 pounds.

Declining production costs and prices for broilers and turkeys, shifts in consumer preferences, the trend toward raising pullets for laying-flock replacements rather than starting straight-run chicks, and the increased rate of lay per bird have all contributed to the declining importance of fowl in the poultry meat supply.

Other poultry, such as ducks, geese, guineas, and game birds, are largely specialty products. In total, however, they amount to a small fraction of a pound per capita. Some of these items (especially ducks) move through old-line wholesalers, institutional supply houses, or even direct to retailers. Consumption of specialty items is likely to be higher in restaurants than at home.

It is estimated that about 20 percent of the volume of mature hens produced on farms is consumed on farms. The remaining volume is sold off-farm, with about 35 percent going to slaughter plants not Federally inspected. The noninspected poultry is largely consumed locally, with most of the volume going directly to retail outlets or consumers. Older homemakers with rural backgrounds and/or below average education, large families and low-income families purchase more fowl than other groups (4). Almost three-fourths of the volume of fowl slaughtered in Federally inspected plants goes into further-processed products. Of the volume of fowl both from inspected and noninspected plants which moves to retail outlets, more than half goes to retail outlets direct from processing plants.

Movements of fowl between producing and consuming areas are similar to these for shell eggs--east and west from the North Central States, northeast, west and south of Florida from the southeast, and north and east from California.

Farm-to-retailer price spreads are slightly wider for fowl than for broilers. While the farm-to-retailer price spread on broilers in 11 cities averaged about 9 cents per pound in recent years, price spreads on fowl in 1964 ranged from 9 to almost over 17 cents (table 6). Spreads on the West Coast are wider than in other regions. The primary reasons for the wider farm-to-retailer price spread on fowl than on broilers are the smaller total quantities handled, the concentration of fowl slaughtered in smaller and higher cost plants, and a somewhat heavier reliance on smaller handlers and retail outlets.

Table 6.--Fowl: Estimated farm-to-retailer price spreads per pound, by regions and market class, United States, 1964 1/

Regions and market class	Farm price 2/	Price to retailers	Price spread
	Cents	Cents	Cents
Northeast:			
Light	10.73	22.52	11.79
Heavy	21.46	30.51	9.05
South:			
Light	9.33	18.62	9.29
Heavy	21.36	32.29	10.93
Midwest:			
Light	9.50	22.35	12.85
Heavy	21.38	32.51	11.13
West Coast:			
Light	7.33	21.76	14.43
Heavy	19.94	36.72	16.78

1/ Based on prices reported by USDA Market News Service for live fowl at farms, in wholesale markets, and delivered to retailers in major cities.
2/ Live prices converted to ready-to-cook equivalent values by using 68 percent yield.

FURTHER-PROCESSED POULTRY PRODUCTS

Interest in poultry products processed beyond the ready-to-cook stage (further processed) has been increasing during recent years. Use of poultry meat for the production of further-processed products, both in absolute quantities and relative to total slaughter has been increasing. About 70 percent of the volume of mature chickens (mainly fowl) slaughtered under Federal inspection was used in further processing in 1965, compared to almost 17 percent of the volume of turkeys slaughtered and less than 3 percent of the young chickens (table 7).

Further-processed products are produced in great variety. Incident to maintaining records under the Poultry Products Inspection Act (1957), the Poultry Division, Consumer and Marketing Service, U.S. Department of Agriculture, specified 10 product categories: soups, pies, dinners, chopped meat combinations, gravy combinations, starch product combinations, infant foods, rolls, whole or part birds, and miscellaneous.

Broilers are chiefly used by the further-processing industry for breaded and cooked parts, chicken dinners, and gourmet items. Mature chickens are used mainly for chicken pot pies, canned soups, canned boned meat, and canned whole chickens, and as an ingredient in various mixtures. Turkey is used mainly for raw roasts, rolls, dinners, and pot pies.

Prices of further-processed products are largely determined on a cost-plus or administrative basis. Because of the more imperfectly competitive environment in which these products are sold, they are less subject to the effects of shortrun price fluctuations of ingredients or the levelling effects of established market quotations. Further-processed products tend to be highly differentiated. Thus, they move in all directions from manufacturing plants. This is in sharp contrast to ready-to-cook poultry, which is highly undifferentiated, tends to be priced in relation to established market quotations, and moves to similar markets from all plants in a given area. Prices of further-processed poultry products are generally quoted on a delivered basis. Many firms maintain flat prices within broad regions, or even nationally. Several items may be similarly priced at some average value for convenience, despite differences in costs.

Cost of poultry meat becomes increasingly unimportant as the complexity of further-processing operations increases and as other ingredients are employed in the end products to an increasing extent. Meat cost accounts for over 70 percent of the plant selling price of such items as boned fowl meat, turkey rolls, and chicken patties; about half of the price of canned whole or boned chicken and cooked chicken parts; one-fourth or less of the price of pies and dinners; and about 10 percent or less of the price of soups and Chinese foods containing poultry meat. Selling prices typically include advertising, selling, delivery, and a markup for risk and uncertainty in addition to plant production costs (table 8). Retail prices are likely to be 15-25 percent higher than plant selling prices.

A substantial share of further-processed items moves from plants direct to large institutional or retail warehouses or outlets. Smaller outlets are frequently serviced by food wholesalers. Many large firms maintain their own sales organizations. Other firms, particularly smaller ones, utilize the services of food brokers. Institutional outlets are relatively more important in relation to total volume further processed than is true of poultry sold in ready-to-cook form.

Table 7.--Poultry slaughtered and eviscerated under Federal inspection, and quantity and percentage further processed, United States, 1961-65

Item	Total eviscerated	Further processed	
		Quantity	Percentage
	Mil. lb.	Mil. lb.	Pct.
1961:			
Young chickens	4,286	78	1.82
Mature chickens	398	217	54.46
Turkeys	1,256	105	8.33
All poultry	5,988	437	7.29
1962:			
Young chickens	4,361	87	1.98
Mature chickens	401	219	54.45
Turkeys	1,097	148	13.45
All poultry	5,905	489	8.29
1963:			
Young chickens	4,607	104	2.25
Mature chickens	417	252	60.33
Turkeys	1,164	191	16.39
All poultry	6,240	584	9.35
1964:			
Young chickens	4,810	124	2.58
Mature chickens	436	257	58.92
Turkeys	1,253	211	16.84
All poultry	6,553	632	9.64
1965:			
Young chickens	5,194	139	2.67
Mature chickens	425	310	72.88
Turkeys	1,330	253	19.02
All poultry	7,002	745	10.64

Table 8.--Processing plants' delivered selling prices for selected further-processed poultry products and relative importance of poultry meat contained in them, United States, 1964-65

Product	Unit	Average price of finished product 1/	Value of poultry meat contained in finished product	Price spread	Value of poultry meat as percent of finished product price
		Dollars	Dollars	Dollars	Percent
Boned fowl meat	Pound	0.60	0.47	0.13	78.3
Canned whole chicken	Case (38.40 lb.)	7.95	4.21	3.74	53.0
Canned boned chicken	Case (27.06 lb.)	20.56	10.93	9.63	53.2
Chicken pot pies	Case (7.34 lb.)	3.56	.62	2.94	17.4
Chicken and turkey soup	Case (20.72 lb.)	4.55	.50	4.05	11.0
Broiled turkey rolls	Pound	.80	.58	.22	72.5
Turkey pot pies	Case (6.00 lb.)	2.43	.61	1.82	25.1
Turkey TV dinners	Case (8.25 lb.)	4.17	.99	3.18	23.7
Chicken patties	Box (7.53 lb.)	5.95	4.21	1.74	70.8
Cooked chicken legs, thighs, drumsticks	Box (11.44 lb.)	7.17	3.58	3.59	49.9
Chicken (fried) TV dinners	Case (9.06 lb.)	4.94	.97	3.97	19.6

1/ Includes plant costs, advertising, selling, delivery to buyer, and plant "markup."

Source: George B. Rogers. Economies of Scale in Plants Producing Further-Processed Poultry Products and Resulting Impacts. Unpublished Ph. D. dissertation, Univ. Md., 1966.

THE ROLE OF COOPERATIVES IN MARKETING

Cooperatives have performed an important pace-setting role in the marketing of poultry and eggs and in furnishing major production inputs. Cooperatives are not discussed separately in other sections of this chapter, but are included among the agencies performing particular functions.

Although cooperatives are not a major factor in the broiler business, a few have survived the competitive struggle and played an important role in marketing broilers. Three cooperative organizations are among the leading broiler firms in the South. Two of these organizations are numbered among the largest exporters of broilers.

Cooperatives are important in assembling, processing, and selling turkeys and in egg packing. Cooperatives have also done much to improve the market quality of turkeys, eggs, and broilers. A substantial number of individual turkey cooperatives are joined together in a federation which does nationwide marketing and sells to the export trade. A cooperative sales agency, representing member organizations in the Northeast, South, and Midwest, plays a major role in setting egg prices on the New York Mercantile Exchange.

Many other examples could be cited of the role of cooperatives. For example, much of the early improvement in poultry slaughter and evisceration was due to the foresight and imagination of cooperatives. Several instances could be shown where the increased competition from newly organized cooperative processing plants helped to raise prices to producers, or cooperative mills provided feed at reduced prices.

Of 479 cooperatives marketing poultry and poultry products in 1963, 95 specialized in poultry and poultry products and 384 handled the commodities as a sideline. New business handled was more than $420 million. Specialized cooperatives handled about 45 percent of this total. Of the cooperatives handling poultry products as a sideline, 213 were farm supply cooperatives; 121, dairy cooperatives; 4, cotton cooperatives; and 36, grain associations. Value of poultry product sales averaged $346,000 per cooperative in 1951 and $878,000 in 1963.

NUMBER AND SIZE OF FIRMS

Poultry and eggs are produced by a relatively large number of farms and sold to consumers at the opposite end of marketing channels by large numbers of retail stores, restaurants, and other institutional outlets. In between, smaller numbers of assemblers and processors consolidate and prepare available supplies for shipment to a small number of wholesalers and retail wholesalers.

Figure 13 shows some rough estimates of the numbers of producers, major input-suppliers, and marketing firms prepared from data available prior to 1961. Numbers of units in all of these categories have been declining steadily in recent years, with most of the decreases in numbers occurring among smaller units. Economies of scale in production, processing, and marketing; increasing density of production; and the growth of enterprises which consolidate production, input-supplying, and processing under common management are all forces tending to reduce numbers of units.

From the numbers of firms shown in figure 13, plus labor input output relationships from selected studies, it is estimated that about a quarter of a million people are involved in input-supplying and marketing functions related to the poultry and egg industries, distributed as follows:

Input-supplying 1/	30,000
Assembling and packing eggs 2/	86,000
Assembling and processing poultry 3/	62,000
Distributing and retailing 4/	50,000
Other 5/	22,000
Total	250,000

1/ Includes mainly chicks, poults, and feed.
2/ Includes breaking and drying.
3/ Includes slaughter, evisceration, and further processing.
4/ Includes receivers, wholesalers, jobbers, institutional supply houses.
5/ Includes long-distance transportation, storage, management, services, information supplying.

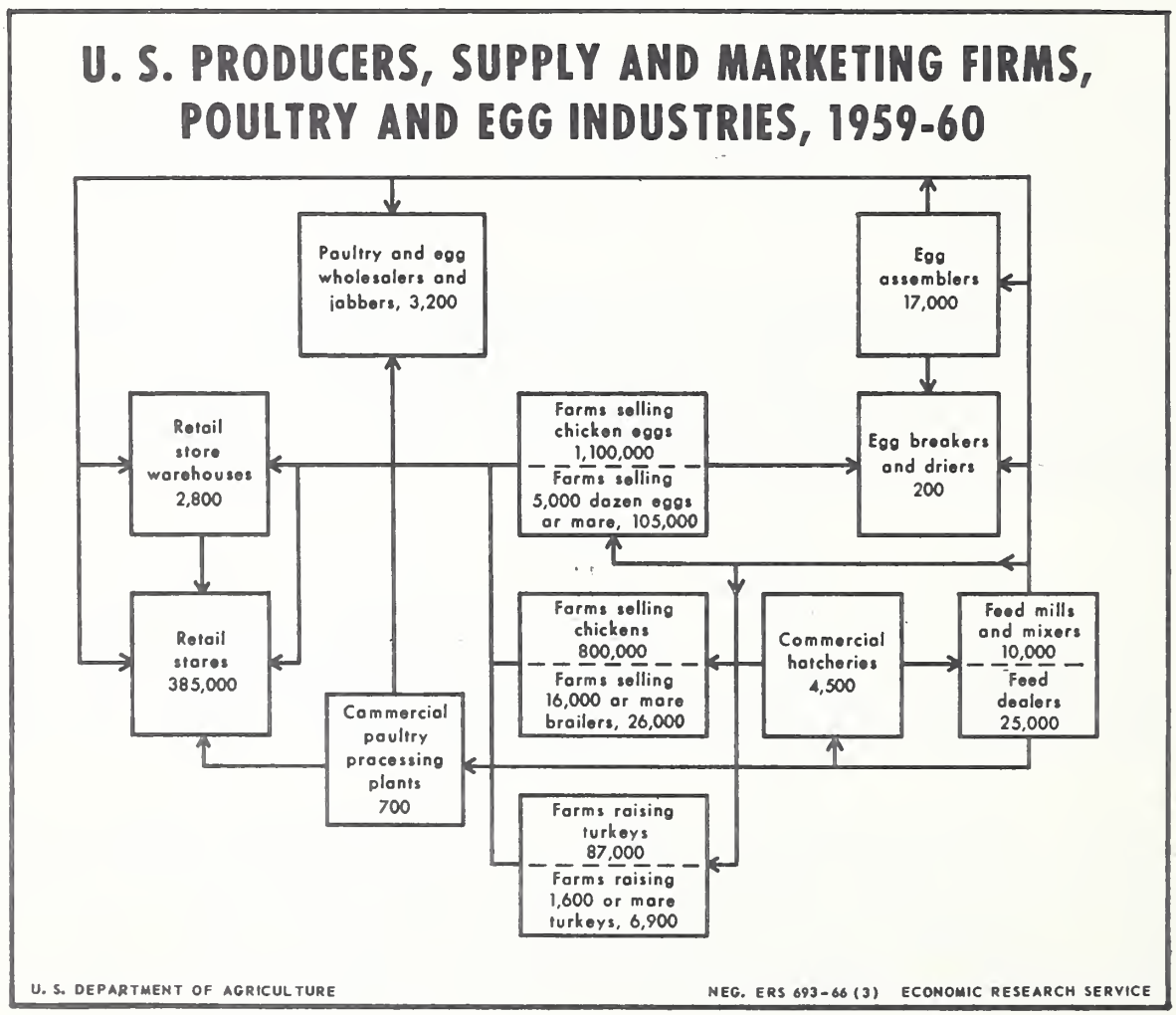

U. S. PRODUCERS, SUPPLY AND MARKETING FIRMS, POULTRY AND EGG INDUSTRIES, 1959-60
Poultry and egg wholesalers and jobbers, 3,200
Egg assemblers 17,000
Retail store warehouses 2,800
Farms selling chicken eggs 1,100,000
Farms selling 5,000 dozen eggs or more, 105,000
Egg breakers and driers 200
Retail stores 385,000
Farms selling chickens 800,000
Farms selling 16,000 or more broilers, 26,000
Commercial hatcheries 4,500
Feed mills and mixers 10,000
Feed dealers 25,000
Commercial poultry processing plants 700
Farms raising turkeys 87,000
Farms raising 1,600 or more turkeys, 6,900
U. S. DEPARTMENT OF AGRICULTURE
NEG. ERS 693-66 (3) ECONOMIC RESEARCH SERVICE

Figure 13

Eggs

No comprehensive national survey of egg handlers has been made since 1958. In that year, the East and West North Central States had a larger proportion of the total number of handlers than they did of total egg production, indicating smaller plants and lower production density per plant than in the other other regions (13). Data for 1965 on firms reporting to the USDA Market News Service indicate firms continue to average somewhat smaller in the Midwest than in some other important egg areas (table 9).

A comparison of 689 U.S. firms in 1965 with 795 in 1963 suggests larger firms are handling an increasing share of the volume (table 10).

While the Midwest historically has been the center of egg breaking, there has been in recent years an expansion in breaking operations in the South and a decline in the number of plants in the Midwest. In 1960, 92 of the 105 plants in the United States producing frozen eggs under Federal inspection were in the Midwest. By 1965, only 63 of the United States total of 96 plants were in the Midwest. During the same period the number of plants in the South producing frozen eggs under Federal inspection rose from 7 to 23.

In addition to the plants producing frozen eggs under Federal inspection, a substantial number of plants operate salvage breaking operations, and some commercial-scale breakers are not under Federal inspection. The salvage operations use mainly cracks, checks, and smaller eggs which are in surplus seasonally. However, most of the larger commercial breakers are under Federal inspection, and these account for the bulk of liquid egg production.

Table 9.--Number of plants and volume of eggs handled by sample firms, 1/ by regions, United States 1965 2/

Region	Distribution of plants	Distribution of volume
	Percent	Percent
North Atlantic	17.0	16.8
East North Central	18.0	15.9
West North Central	25.2	17.6
South Atlantic	16.4	16.4
South Central	12.2	13.3
Western	11.2	20.0
Total	100.0	100.0

1/ Firms reporting to USDA Market News Service in connection with Commercial Egg Movements Report..

2/ 5-week average, mostly March to early April.

Table 10.--Eggs handled by sampled firms, 1/ by size groups, United States, 1963 2/ and 1965 3/

Size group	Distribution of plants		Distribution of volume	
	1963	1965	1963	1965
	Percent	Percent	Percent	Percent
Under 400 cases	18.0	19.7	2.7	2.2
400 - 699 cases	20.5	20.5	6.3	5.6
700 - 999 cases	13.6	12.3	6.4	5.4
1,000 - 3,999 cases	39.1	36.6	43.3	39.1
4,000 and over cases	8.8	10.9	41.3	47.7

1/ Firms reporting to USDA Market News Service in connection with Commercial Egg Movements Report. 795 firms handling 1,383,646 30-dozen cases in 1963; 689 firms handling 1,325,100 cases in 1965.
2/ 5-week average, mostly mid-April to mid-May.
3/ 5-week average, mostly March to early April.

Poultry

The number of slaughtering plants is now declining under the impact of potential economies of scale, increasing density of production, and consolidation of functions under common management. Most of the plants going out of business are small. From 1962 to 1964, the number of plants slaughtering under Federal inspection fell almost 10 percent. The proportion of total slaughter being performed by plants doing a volume of 30 million pounds or more annually rose substantially during that time (table 11). Slaughtering plants in major commercial broiler producing areas tend to be larger than those in areas where turkeys or fowl are of greater relative importance. The South Atlantic and South Central areas have a larger share of total slaughter than of the total number of plants (table 12).

In earlier years, when the rate of growth of commercial broiler and turkey production was more rapid than at present, number of slaughtering plants was rising. Since aggregate output of further-processed poultry products is still increasing, there is an upward trend in number of further-processing plants. When the rate of growth in total output of further-processed products slows down, the potential economies of scale which also exist in further processing may begin to effect a reduction in plant numbers.

Currently, more than three-fourths of the further-processing plants are not directly associated with slaughtering and eviscerating units (table 13). Some evidence exists that, because of the kinds of products they make and the types of outlets they service, plants for further processing are market oriented rather than production oriented. Nevertheless, additional opportunities do exist, where areas of concentrated production and population are close to each other, to locate both the slaughtering and evisceration and the further-processing operations at country points.

Eight percent of the firms use over 70 percent of the volume of ready-to-cook poultry used in further processing. About 22 percent of the firms use over 90 percent (table 14).

About 25 percent of the further-processing firms are located in the North Atlantic region, 18 percent in the East North Central region, 16 percent in the West North Central region, 14 percent in the South Atlantic region, 11 percent in the South Central region, and 16 percent in the Western region.

Table 11.--Poultry slaughtered under Federal inspection: Distribution of plants and volume, by plant size, United States, 1962 and 1964 1/

Plant size (1,000 pounds per year)	Distribution of plants		Distribution of volume slaughtered	
	1962	1964	1962	1964
	Percent	Percent	Percent	Percent
Under 1,000	16.4	15.1	0.2	0.1
1,000 - 4,999	18.6	15.5	3.4	2.2
5,000 - 9,999	16.4	11.5	8.4	4.9
10,000 - 29,000	32.8	35.7	40.0	36.0
30,000 and over	15.8	22.2	48.0	56.8

1/ 532 firms handling 8.1 million pounds in 1962; 482 firms handling 8.9 million pounds in 1963.

Source: Compiled from records of Poultry Division, Consumer and Marketing Service, U.S. Department of Agriculture.

Table 12.--Poultry slaughtered under Federal inspection: Distribution of plants and of volume, by regions, United States, 1964

Region	Distribution of plants	Distribution of volume
	Percent	Percent
North Atlantic	12.6	9.0
East North Central	13.2	4.5
West North Central	16.6	9.9
South Atlantic	22.2	34.9
South Central	24.2	34.2
Western	11.0	6.7

Source: Compiled from records of Poultry Division, Consumer and Marketing Service, U.S. Department of Agriculture.

Table 13.--Number of plants slaughtering and further processing poultry under Federal inspection, United States, 1960-65 1/

Year	Slaughtering and eviscerating	Slaughtering, eviscerating, and further processing	Only further processing	Total plants engaged in further processing
	No.	No.	No.	No.
1960	546	64	231	295
1961	536	82	271	353
1962	531	88	290	378
1963	488	80	306	386
1964	477	99	328	427
1965	477	105	347	452

1/ (1) Dec. 1960, Dec. 1961, June 1962, June 1963, July 1965, March 1965.

Table 14.--Distribution of plants and volume of poultry used in further processing poultry under Federal inspection, United States, 1964 1/

Plants size (1,000 pounds)	Number of plants 2/	Ready-to-cook poultry used in further processing	Percentage distribution	
			Plants	Poultry
	Number	Mil. pounds	Percent	Percent
Less than 100...	218	5.8	49.1	0.9
100 - 499.....	88	19.6	19.8	3.1
500 - 999.....	41	29.6	9.2	4.7
1,000 - 4,999...	61	132.4	13.8	21.0
5,000 and over..	36	444.2	8.1	70.3
Total.....	444	631.6	100.0	100.0

1/ Compiled from data from Poultry Division, Consumer and Marketing Service, U.S. Department of Agriculture.
2/ The total number of plants is larger than that shown in table 16 because data are for different periods in 1964.

PRICE DETERMINATION

Basic levels of prices for eggs and poultry are determined at the plant or wholesale levels. Prices paid producers are determined by subtracting from the basic price margins to cover cost of transportation, processing and packing, and assembly. Prices at other levels are determined by adding margins to cover distributing and retailing functions.

Shell Eggs

Base price quotations determined in New York, Chicago, Boston, and Los Angeles play the major role in determining prices paid and received for eggs at terminal markets and country points. Premiums and discounts are applied to the base quotations to reflect differences in quality, quantity, and level of trading.

In New York City, base price quotations are determined by one of the trade publications. The reporter observes trading on the New York Merchantile Exchange, and evaluates this information together with information on supply, demand, and sales within and outside of the New York wholesale market district. The mechanics of determining base price quotations at Chicago are quite similar to those at New York, except that on many days there are fewer bids, offers, and sales on exchange to

guide the market reporter. In Boston, there is no exchange trading, and the market reporter must rely solely on information obtained directly from the trade. At Los Angeles, the USDA Market News Service reports prices paid at various levels of trading. However, egg dealers, in paying producers, use the outside of the range of the Grade A large and Grade A medium prices to retailers for loose eggs in cases, f.o.b. distributor's plant.

Prices published in the Boston Herald are used throughout most of the New England region in arriving at actual prices paid to producers and paid by retailers. Chicago base prices are used by many egg assemblers in an area extending from Chicago into eastern Iowa, Illinois, Missouri, and the Western parts of Tennessee, Kentucky, Indiana, and Michigan. Some firms in this area also use New York base prices. New York base prices are usually used from Michigan and Ohio to New York; in an irregular area south through the eastern seaboard and the Southeastern States; and in the Dakotas, Minnesota, Iowa, Missouri, and Arkansas. West Coast prices are used in the Western States and overlap the New York base pricing area in Idaho, Montana, Wyoming, Utah, Colorado, and Texas.

Poultry

On broilers, the key level in determining prices is the processing center in major producing areas. In past years, both the live prices or quotations of prices at which contractors and producers sold to processing plants, and the ready-to-cook prices at which processors sold to wholesalers or retailers were utilized as base prices. In recent years, actual sales of live birds have been shrinking, with the transfer of birds from one segment of an integrated firm to another segment becoming more characteristic at the live level.

Reports issued and information obtained from Federal-State Market News services are the source of base price quotations on broilers. Information is also available on prices received for ready-to-cook broilers delivered to buyers in major terminal markets. These are usually related to values in major producing areas, the differences being accounted for by the intervening transportation and handling charges. Terminal market prices are frequently quoted, as in New York, according to area of origin. For example, in New York, the Maine, Delmarva, and Georgia broilers may be separately priced, with the differences presumably indicating variations in size, quality, or particular channels.

The two price reports most widely used by members of the turkey industry are those by one trade publication at New York and by the USDA Market News Service. "Inside" or lowest prices represent wholesale-level tranactions for larger lots, such as carload or truckload, while "outside" or highest prices represent less than car or trucklot sales. Processors at country points also place strong reliance on information from brokers, wholesalers, packers, and other processors. Thus, processors' selling prices do not follow New York quotations exactly because of specific conditions in producing areas or other markets.

Base Price Quotation Systems

The use of base price quotation systems is generally held to provide a rapid and efficient means for the industry to arrive at prices and thus to save the time and costs associated with thousands of independent negotiations. However, there is a tendency for many firms to adopt the quotations as a basis for settlement without playing an

active role in price determination. This can be carried to a point at which there are only a few independent decisions on which to establish an equilibrium market price.

A technical distinction can be made between quotations and reported prices. For a quotation, the reporter uses partial and sometimes fragmentary knowledge to sense the trend of the market. Daily price reports, on the other hand, are usually compiled after most of the day's transactions have been completed. Reliance upon reported prices as a base involves an additional time lag. In practice, use of either quotations or reported prices may reflect "followship" rather than active participation in price determination.

Another criticism of base price quotations is that they may not accurately reflect supply and demand, except possibly in the particular market where they are developed, and that as a result, prices in the market where the base is determined can fluctuate rather violently at times. This, in outlying areas using this base, may produce price variations that are not warranted on the basis of local supply and demand conditions.

Recently, the live broiler price quotation in the South by the USDA Market News Service was discontinued because of the extremely thin sample of live sales on which to base a price. However, many people inside and outside the South who had habitually used the live quotation as a basis for determining contract settlements or live paying prices have switched to the live price quotation now offered by State agencies.

The New York base price quotation for eggs has been questioned for some years--first because trading is thin on the Mercantile Exchange, and second because the quotation fully reflects conditions only in the New York wholesale market. The point has also been raised that the New York quotation is for a wholesale grade of eggs in cases whereas most eggs move into retail channels as consumer grades in cartons. Thus, the base--and even more now than formerly--fails to directly represent the kind of eggs moving in greatest volume in trade channels.

Two further questions evolve in considering base price quotations. These can exist even if the argument about thinness of trading can be explained away by proving that even token trading is truly representative of the particular market, and even if broad supply and demand forces do get representation. The first question concerns the problems which arise in negotiating translations of the price of product of particular grade and size at a particular place into values for other grades and sizes at another place. Such values should properly reflect not only direct costs, but grade loss as well. The second question is, does the base price quotation adequately represent the general level of prices or understate it?

Some people in the industry feel that the present base price quotation system merely needs to be slightly altered or updated. Other people feel alternative pricing systems should be considered such as: (1) decentralized pricing; (2) committee pricing; and (3) administered and formula pricing.

The Role of the Retailer in Price Determination

As the major sellers of poultry and eggs to consumers, retail food organizations occupy a strategic spot in marketing. They are the focal point in offering new products and packages, bearing the brunt of consumer dissatisfaction with product quality, and reflecting the wishes of consumers back to others in production and marketing. It has also been alleged that they can use market power to influence prices. In

particular, it is said that what major chains decide to pay next week for broilers, or for turkeys prior to the Thanksgiving and Christmas holidays, sets the level of the market.

The retailers' expressed desire is to be "competitive" with firms of similar size and importance in individual markets. They also wish to convey a particular price or quality image to consumers. As important buyers, retailers are necessarily a major force in price negotiation. But the particular way they play their role can be affected by overall company policies. People who advocate committee pricing usually specify that retailers' must be represented because of their important place in marketing.

INTERREGIONAL COMPETITION

Substantial changes have occurred in the past two decades in the total output of eggs, broilers, and turkeys. At the same time, the relative importance of various regions has shifted. Changes in regional positions in production are indicative of the net results to date of various forces related to interregional competition. Areas which are expanding have relied heavily on integration and contract production. Recent trends can be expected to continue unless drastic changes occur in the structure and efficiency of the industry in declining areas.

Egg production expanded substantially during World War II because of increased demands for domestic, military, and overseas needs. Since the 1950's, production has increased more slowly than population. The volume of eggs produced has declined both relatively and absolutely in the North Atlantic, East North Central, and West North Central regions. The South has emerged as an important surplus area, output there now exceeding that in the North Central region, the major surplus area for many years (table 15).

Broiler production increased almost five-fold from 1940 to 1950. It increased almost three-fold from 1950 to 1960. From 1960 to 1964, the increase was about 20 percent. Output increased in all areas from 1940 to 1960, but the greatest relative and absolute gains were achieved by the South Atlantic and South Central regions. From 1960 to 1964, output declined both relatively and absolutely in the North Atlantic, East North Central, and West North Central Regions. By 1964, about 85 percent of broiler output was in the South.

Total production of turkeys was about three times as large in 1964 as in 1940. The North Atlantic region was the only one to show a decline in absolute volume of production from 1950 to 1964. Since 1950, the proportion of total production accounted for by the East and West North Central, South Atlantic, and South Central regions has increased, while the shares of the North Atlantic and Western regions have declined.

Interest in studies of interregional competition has been increasing in recent years. Older poultry and egg producing areas are greatly concerned about their declining positions. Individual firms in all areas must make decisions about where to locate future facilities and the kind of production, input-supplying, and marketing arrangements to establish.

The competitive position of a region is affected by the following factors: (1) the kind of marketing system, and the size and efficiency of marketing firms; (2) size of production unit and production density; (3) distance from markets; (4) structure

Table 15.--Changes in regional production of eggs, broilers, and turkeys, for selected years, 1940-64

Eggs

Regions	1940		1950		1960		1964	
	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage
	Mil.	Pct.	Mil.	Pct.	Mil.	Pct.	Mil.	Pct.
North Atlantic	6,298	15.9	10,137	17.2	9,995	16.3	9,603	14.9
East North Central	8,593	21.6	11,743	20.0	10,787	17.6	9,415	14.6
West North Central	10,415	26.2	16,690	28.3	15,067	24.5	12,069	18.8
South Atlantic	3,443	8.7	5,156	8.7	8,036	13.1	10,319	16.0
South Central	6,615	16.7	8,786	14.9	8,745	14.2	12,159	18.9
Western	4,340	10.9	6,442	10.9	8,747	14.3	10,788	16.8
United States	39,707	100.0	58,954	100.0	61,377	100.0	64,353	100.0

Broilers

Regions	1940		1950		1960		1964	
	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage
	Thou.	Pct.	Thou.	Pct.	Thou.	Pct.	Thou.	Pct.
North Atlantic	17,000	11.9	79,119	12.5	147,057	8.2	134,945	6.2
East North Central	13,600	9.5	52,637	8.3	79,472	4.4	51,151	2.4
West North Central	5,125	3.4	25,649	4.1	46,709	2.6	48,284	2.2
South Atlantic	76,900	54.0	293,129	47.3	777,869	43.3	917,980	42.6
South Central	22,516	15.9	123,337	19.5	654,975	36.5	914,562	42.3
Western	7,621	5.3	52,587	8.3	89,636	5.0	93,095	4.3
United States	142,762	100.0	631,458	100.0	1,795,718	100.0	2,159,917	100.0

Turkeys

Regions	1940		1950		1960		1964	
	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage
	Thou.	Pct.	Thou.	Pct.	Thou.	Pct.	Thou.	Pct.
North Atlantic	1,944	5.8	4,074	9.2	3,330	3.9	2,923	2.9
East North Central	2,862	8.5	5,368	12.1	12,662	14.9	14,745	14.8
West North Central	11,674	34.5	11,341	25.5	30,163	35.7	33,944	34.2
South Atlantic	2,195	6.5	5,602	12.6	9,091	10.7	13,499	13.6
South Central	6,569	19.4	4,867	11.0	8,326	9.8	11,677	11.8
Western	8,547	25.3	13,141	29.6	21,200	25.0	22,518	22.7
United States	33,791	100.0	44,393	100.0	84,772	100.0	99,306	100.0

Source: (7, 25, 26).

and efficiency of input-supplying system; (5) levels of factor prices; and (6) possible returns from egg and poultry production versus alternative agricultural and non-agricultural pursuits.

INTEGRATION AND SPECIALIZATION

In the early days of the poultry industry, the poultryman performed many functions. He frequently kept a breeding flock, hatched his own chicks, made his equipment, hand-mixed his poultry feed, grew out his replacements, sold live or dressed surplus cockerels, cull pullets, and fowl, hauled some eggs and poultry to local markets, and

did considerable experimenting with strains of birds, feeds, and remedies for diseases, parasites, and management. In a sense, his operations were vertically integrated. He performed many of these functions as much from necessity as choice since the industry was small and decentralized.

This type of enterprise gradually gave way to increased specialization as better transportation and communication developed, new methods and services were offered, and technology made larger production and marketing units feasible. Breeding and hatching functions left the individual farm, as specialized strains for meat or egg production were developed. Feed mixing passed to the commercial mills. Mills and feed stores rounded out their businesses by handling equipment necessary for raising poultry and remedies needed to combat disease they might contact. Commercial slaughtering plants and egg handling plants came out to the farm for supplies and performed additional marketing functions for the farmer. Public agencies and private firms went into scientific research.

Rapid expansion of the industry began in the 1930's and was accelerated by the increased need for poultry and eggs during World War II. Techological breakthroughs hastened the trend to fewer and larger production and marketing units.

Competition intensified in the postwar years, and increased attention was given to cost reduction, especially through expanded unit sizes and utilization of capacity. These developments brought about a major need for coordinating various production, supply, and marketing activities.

The second major need was for improved quality and uniformity of product, and a more even volume during the year. In retrospect, the reluctance of some producers to follow improved production practices, to resolutely maintain and preserve quality, and to anticipate the growing need for producing to specification, was a major force in promoting the spread of vertical integration.

In recent years, new dimensions have been added to the need for better coordination of production, supply (feed and chicks), and marketing functions. These are the problems of effectively meeting the needs of mass-volume retailing, of diversifying products to retain and expand levels of usage of poultry products by consumers, and of meeting capital needs in a mechanized and commercialized agriculture. The timidity of traditional lending agencies created a void which supply and marketing firms have filled.

The structural evolution of the poultry industry has made a full cycle from (1) integration of various functions, to (2) a series of separate and specialized functions, to (3) a reintegration of various functions under common management. But the role of the producer has not followed this cycle. The producer changed from local integrator to independent specialist, but his third step was to become a member, (and frequently a subordinate member) of a conglomerate enterprise. With this integration of functions, the precise separation of producing, input-supplying, and marketing roles has been blurred.

It is estimated that from 30 to 35 percent of market eggs are produced under some type of contract or marketing agreement. Farm operators have written or verbal contracts with feed companies or egg packing plants. Feed companies contract to finance producers for the purpose of selling more feed. Egg-packing plants have marketing agreements with producers to control the quality and supply of eggs. These marketing agreements may contain incentives for high yields of Grade A eggs and penalties for low quality. Some firms have found it advisable to pay a differential

to producers who raise fall and winter hatches of birds to obtain an even supply of eggs throughout the year.

At least 95 percent of the commercial broiler production and 60-65 percent of turkey production is carried out under contractual arrangements. These involve arrangements between producers and either processors or suppliers of inputs. The main reasons for contracting are to give processors more control over the volume, quality, and timing of production, or provide a guaranteed outlet for suppliers of input.

Many of the marketing functions which were once performed in large part by separate firms are now consolidated in one firm. Examples of this are the live assembly and slaughter of poultry and the local assembly, packing, wholesaling, and jobbing of eggs. The typical poultry processor now either owns his own trucks for assembling live poultry or contracts out the job whereas, formerly, there were many live-poultry dealers who bought from producers and sold to processors (23).

Firms carrying out assembling, processing, and distributing functions are likely to specialize in handling either poultry or eggs, rather than both, in the same plant. Where both are handled, larger specialized plants or departments may exist.

THE FARMER'S BARGAINING POWER

Two factors have resulted in increasing concern about the strength of producers to bargain effectively for their fair return in shortrun situations. The first is the residual nature of producers' returns. The second is the growth of large-scale integrated firms.

In the past, when there was relatively little integration of production, input-supplying, and marketing functions, and the producer made all decisions about the volume and timing of output, year-to-year changes in output and prices were more pronounced. The producer had a means of reacting to prices. Thus, the active concern of regulatory and research agencies and producer groups about bargaining power was expressed by efforts to promote indirect measures. These include (1) forming and consolidating marketing cooperatives; (2) improving quality; (3) developing premium local markets; (4) obtaining better statistics and marketing information; and, (5) improving production and marketing efficiency to lower costs of production and enable savings in marketing to filter back down to the producer.

In recent years, the producer has given up much of his decision-making power relative to the volume and timing of output, while being required to meet additional quality and input-using requirements. He deals increasingly with large-scale suppliers, marketing firms, and integrators. Consequently, there has been increasing interest in more direct measures to enhance farmer's bargaining power, such as producer bargaining associations, voluntary control programs, and marketing agreements, orders, and quotas. There is heightened interest in programs related to antitrust measures and business ethics.

In contract production, the return to the grower is frequently not directly related to a market price. Rather, it may be based on production efficiency factors or it may be compensation for particular inputs, such as housing, equipment, labor, and utilities furnished by the grower. Regarding such arrangements, a basic deficiency exists in the lack of a continuous reporting system on returns to producers under contract production.

Moreover, where control over production decisions rests with agencies other than the producer, or is at least shared by them, the tendency is to maintain or even expand output. Costs of operating processing and packing plants and feed mills and hatcheries can be minimized by high-capacity operation. On the other hand, overproduction can chronically depress producers' returns and create a low-price image of eggs and poultry in the minds of consumers. Finding an optimum solution which will reconcile varying points of view while protecting the economic interests of all participants is a formidable task.

TECHNOLOGICAL CHANGES RELATED TO MARKETING

Technological developments have provided the impetus for modern poultry marketing. Most technologies in marketing were developed and put into use between World War II and the Korean Conflict. Although this was the period of most rapid adaptations of technology, new adaptations and innovations continue today.

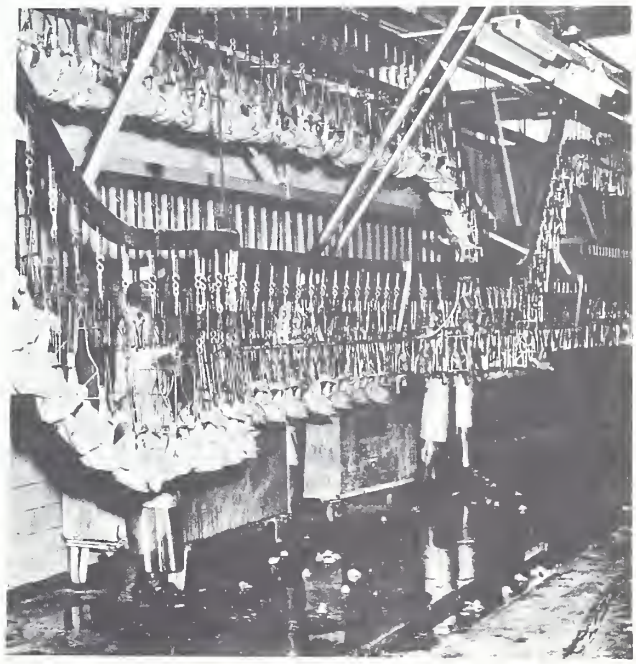
The marketing industries make use of industrial techniques and assembly line methods for changing the form of the product, handling it, and speeding it on to the consumer.

The factors that triggered the adjustments in egg marketing were the decline in number of egg producers, increase in size of flocks, changes in organization and type of egg assembly, improvements in refrigeration and truck transportation, development of large-scale retail operations, and development of new machinery which facilitated the grading operation.

Several machines and systems have been developed in recent years for use in grading and packing. Not all firms have been quick to adapt these; however, many large organizations have become highly automated. Firms which are automated have reduced their costs per unit of output and increased their efficiency.

One piece of equipment which has facilitated the handling of eggs in bulk is the flash candler. Eggs are lighted from below as they move on a conveyor, which allows the observation and detection of exterior and interior defects. Along with the flash candler and integrated in a continuous line are egg washers, automatic sizers, and cartoning and packaging devices. The complete grading and cartoning operations are done with very little hand labor. Eggs are put on at one end of the line, and come off the other end packed and ready for shipment.

In egg products, technology has also made its mark. In large-volume egg-breaking establishments, hand breaking has been displaced by automatic machines. Thirty percent of the Nation's liquid egg production in 1960 came from automated plants, and 40 percent a year later. Trucks with insulated tanks to transport per-cooled liquid eggs to their destinations



Typical processing line with poultry being prepared for ready-to-cook market.

have speeded operations. Stablization of natural glucose in drying eggs has improved.

Prior to World War II, poultry processing was largely a batch operation performed manually. Output per hour was limited to the speed of manual operations. Only a few hundred birds per hour could be processed in the New York dressed form.

During the war, the "red meat" shortage created additional demand for poultry meat, and labor and other resources were scarce. Thus, new methods of processing were readily adopted. After the war, further improvements in processing were required to meet changing consumer demands and preferences. The change from New York dressed to ready-to-cook poultry was accompanied by the development of automatic and semiautomatic machinery used in evisceration.

Today, practically all poultry is processed in the ready-to-cook form. Modern plants can process 10,000 or more broilers per hour and 2,500 or more turkeys per hour. Many innovations have been originated by private processing or equipment firms.

In modern processing plants, mechanical conveyor lines move live poultry into the dressing operations and ready-to-cook poultry into packing, weighing, and loading areas. Modern plants are designed specifically for poultry processing and are primarily straightline operations. Automatic picking machines with rubber fingers defeather the birds. In evisceration, lungs are extracted by vacuum; gizzards are machine peeled. Automatic sizing machines eliminate hand weighing in plants. Development of continuous chillers on the line has reduced time, labor, and space requirements.

Flushing of feathers and offal through chutes to feather and offal worms has streamlined the movement of byproducts. In the early period of the processing industry, refuse was a problem. Research in the 1950's provided means of breaking the various waste products into components such as fats and proteins. Plants for rendering by products convert the refuse into components which are sold to soap manufacturers, animal feed mills, and fertilizer industries.

Passage of the Federal Inspection Act in 1959 for poultry traveling interstate caused plants to increase quality and sanitation levels. Undoubtedly some plants adopted new equipment and procedures in order to comply with the act.

In terms of physical volume, the average poultry worker in 1963 turned out 50 percent more per hour of work than in 1954 (table 16). Poultry industry output increased 127 percent from 1954 to 1963 while man-hours of labor increased in 51 percent.

The improvement in refrigerated trucks has made possible fast, inexpensive shipments of ready-to-cook broilers to the consuming centers. Truck transportation has also made it possible for processing plants to lower assembly costs.

A LOOK AHEAD

The poultry industry of the future will continue to develop in directions which have become apparent during the last two decades.

An even higher degree of coordination of producing, input-supplying, and marketing activities will evolve. The major results of increased coordination are likely

Table 16.--Poultry Industry Shipments: Indexes of output, man-hours, and output per man-hour, 1954, 1958, and 1963

(1954=100.0)

	1963	1958	1954
Shipments	227.2	168.7	100.0
Man-hours	151.5	131.0	100.0
Output per man-hour	150.0	128.8	100.0

to be increased price stability, ability to produce standardized items for various markets, some further lowering of combined costs of producing and marketing, and a growing importance of multiple-plant and multiple-function firms.

Numbers of units performing various functions will decrease further and unit sizes will increase. The primary reason for this will be the attempt to realize the inherent economies of scale which exist in various activities. Further mechanization and automation of operations will occur, further reducing the relative importance of labor costs.

Primarily because of differences in the relative importance of alternative employment opportunities from region to region, much of the production of eggs, broilers, and turkeys will continue to be concentrated in certain regions. While large-scale integrated production-marketing firms designed to serve local markets may increase, there will still be surplus and deficit regions. Thus, there will continue to be local and long-distance marketing systems. The South will retain its position of predominance in broiler production, and become of greater relative importance in egg and turkey production. However, the Midwest will continue to be an important egg-and turkey-producing region, and areas in the East and Far West also will remain important egg-producing areas.

With the growing affluence of an increasingly urbanized society, convience products (further-processed poultry items and products using liquid, frozen, and dried eggs) will increase in importance. However, this development will be gradual and use of these product forms will not substantially replace the more traditional forms of ready-to-cook poultry and shell eggs. Aggregate per capita use of eggs will eventually stabilize at a slightly lower level than at present, while per capita use of broilers and turkeys will increase from present levels.

SUMMARY

The marketing of poultry and eggs has undergone rapid and substantial changes since World War II. This has been facilitated by significant advances in production and marketing technology and by structural innovations.

For all of the major items--shell eggs, broilers, and turkeys--farm-retail spreads have declined or remained stable even though wage rates and other factor prices have risen. Improvements in plant operating efficiency, larger production units, improved quality, higher density of production, and more direct marketing channels have been responsible for the reductions in marketing costs.

The major marketing channels for shell eggs are from producer to assembler-shipper to wholesale distributor to retailer. However, movement from assembler-shipper (or assembler-distributors) directly to retailers is growing, as is direct delivery to retailers by large integrated producers. The major geographic movements of eggs are east and west from the North Central States; to the northeast, west, and south to Florida from the Southeast; and north up the Pacific Coast and east to the Mountain and Southwest and South Central States from California.

The major marketing channels for broilers are from producer to processing plants either to wholesale distributor or directly to retail warehouses or outlets. Similar major channels also exist for turkeys. The main long-distance geographic movements of broilers are to the large cities of the Northeast, Midwest, and Far West. Most of this volume comes from Georgia, North Carolina, Arkansas, Alabama, Mississippi, Delmarva, and Maine. The predominant movement of turkeys is from west to east.

Poultry and eggs are produced by relatively large numbers of farms and sold to consumers at the opposite end of marketing channels by large numbers of retail stores, restaurants, and other institutional outlets. In between, smaller numbers of assemblers and processors consolidate and prepare available supplies for shipment to fewer wholesalers, stores, and retail warehouses. Numbers of both producers and processing and marketing firms have been declining rapidly. Economies of scale in production, processing, and marketing; increasing density of production; and the growth of enterprises which consolidate production, input-supplying, and processing under common management are all forces tending to reduce numbers of units.

At least 95 percent of the commercial broiler and 60-65 percent of turkey production is carried out under contractual arrangements between producers and either suppliers of inputs or processors. About 30-35 percent of market-egg production is under some type of contract or marketing agreement with a packer or a feed company.

Basic levels of prices for eggs and poultry are determined at the processing or wholesale levels. Producer prices are determined by subtracting margins to cover transportation, processing and packing, and assembly functions. Prices at other levels are determined by adding margins to cover distributing and retailing functions. Base price quotations at major markets or shipping points are generally used to help establish values at other places, levels of sale, and various levels of quality.

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